

Service Manual

Simplified

DIGITAL PROPRIETARY TELEPHONE
FOR DIGITAL SUPER HYBRID SYSTEM

KX-T7431

White Version

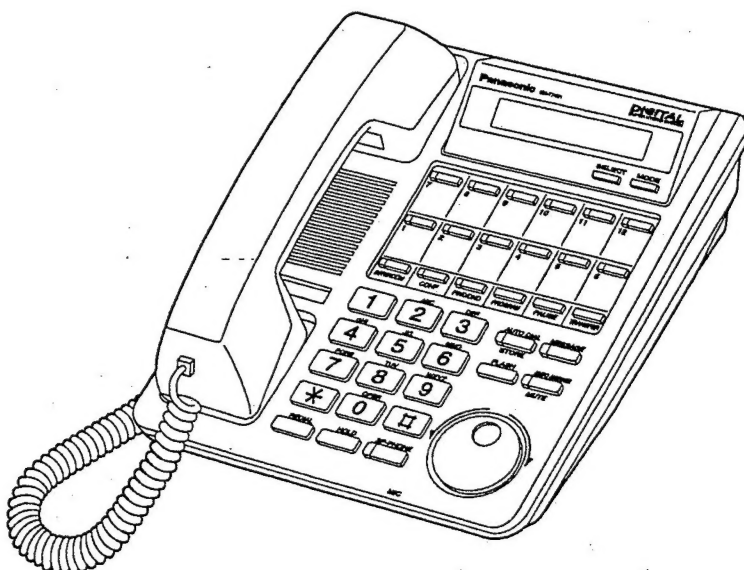
KX-T7431-B

Black Version

(for U.S.A.)

Please file and use this manual together with the service manual for Model No. KX-T7431C/KX-T7431C-B, order No. KMS9809310C1.

This service manual indicates the main differences between; Original KX-T7431C/KX-T7431C-B and KX-T7431/KX-T7431-B.



WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Panasonic

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KX-T7431/KX-T7431-B
PARTS COMPARISON TABLE (Change from original pages 39 ~ 41.)

Ref. No.	Part No.		Part Name & Description	Pcs/ set	Remarks
	KX-T7431C/ KX-T7431C-B (Original)	KX-T7431/ KX-T7431-B			
CABINET AND ELECTRICAL PARTS					
19	PSBX1053Z1	PSBX1053Z3	BUTTON, 18KEY (KX-7431)	1	
19	PSBX1053Z2	PSBX1053Z4	BUTTON, 18KEY (KX-7431-B)	1	
22	PQQT11166Z	-----	LABEL, NOTE	0	Deletion
33	PSQT1309X	-----	LABEL, CAUTION (KX-T7431C)	0	Deletion
33	PSQT1309W	-----	LABEL, CAUTION (KX-T7431C-B)	0	Deletion
	-----	PSGT1563Z	NAME PLATE (KX-T7431)	1	Addition
	-----	PSGT1609Z	NAME PLATE (KX-T7431-B)	1	Addition
ACCESSORIES AND PACKING MATERIALS					
	-----	PSQX1525Z	INSTRUCTION BOOK	1	Addition
P1	PSPK1363Z	PSPK1389Z	GIFT BOX (KX-T7431)	1	
P1	PSPK1417Z	PSPK1428Z	GIFT BOX (KX-T7431-B)	1	
MAIN BOARD PARTS					
PCB1	PSWP1T7431C	PSWP1T7431UK	MAIN BOARD ASS'Y (RTL)	1	
C36	PSCEV0JA470	PSCEV1HA100	CAPACITOR, 10μF	1	
C37, 42	PQCUV1C224KB	PQCUV1H473MD	CAPACITOR, 0.047μF	2	
C106	PQCUV1H152KB	-----	CAPACITOR, 0.0015μF	0	Deletion
R22	ERJ3GEYJ820	ERJ3GEYJ470	RESISTOR, 47Ω	1	
R63	ERJ3GEYJ223	ERJ3GEYJ153	RESISTOR, 15kΩ	1	
R65	ERJ3GEYJ104	ERJ3GEYJ393	RESISTOR, 39kΩ	1	
R92	ERJ3GEYJ152	ERJ3GEYJ272	RESISTOR, 2.7kΩ	1	
R94	ERJ3GEYJ471	ERJ3GEYJ122	RESISTOR, 1.2kΩ	1	
R118	ERJ3GEYJ103	-----	RESISTOR, 10kΩ	1	Deletion
R515	ERJ3GEY0R00	ERJ3GEYJ123	RESISTOR, 12kΩ	1	
LCD BOARD PARTS					
PCB2	PSWP2T7431G	PSWP2T7431UK	LCD BOARD ASS'Y (RTL)	1	
SWITCH BOARD PARTS					
PCB3	PSWP3T7431C	PSWP3T7431UK	SWITCH BOARD ASS'Y (RTL)	1	

Service Manual

DIGITAL PROPRIETARY TELEPHONE
FOR DIGITAL SUPER HYBRID SYSTEM

KX-T7431C

White Version

KX-T7431C-B

Black Version

(for Canada)



■ SPECIFICATIONS

Station Loop Limit:	40 ohms
Cabling Method:	2 pair wire
Jacks:	Main Unit, Handset/Headset, Telephone
Display:	16 digits (max.)
Dimensions:	208 (W)×105 (H)×232 (D) mm with handset
Weight:	960 g

Design and specifications are subject to change without notice.

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When you note the serial number, write down all of the 11 digits. The serial number may be found on the label affixed to the bottom of the unit.

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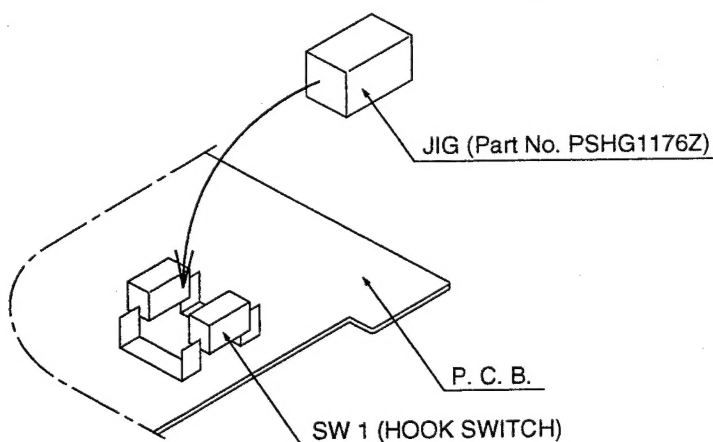
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FOR SERVICE TECHNICIANS

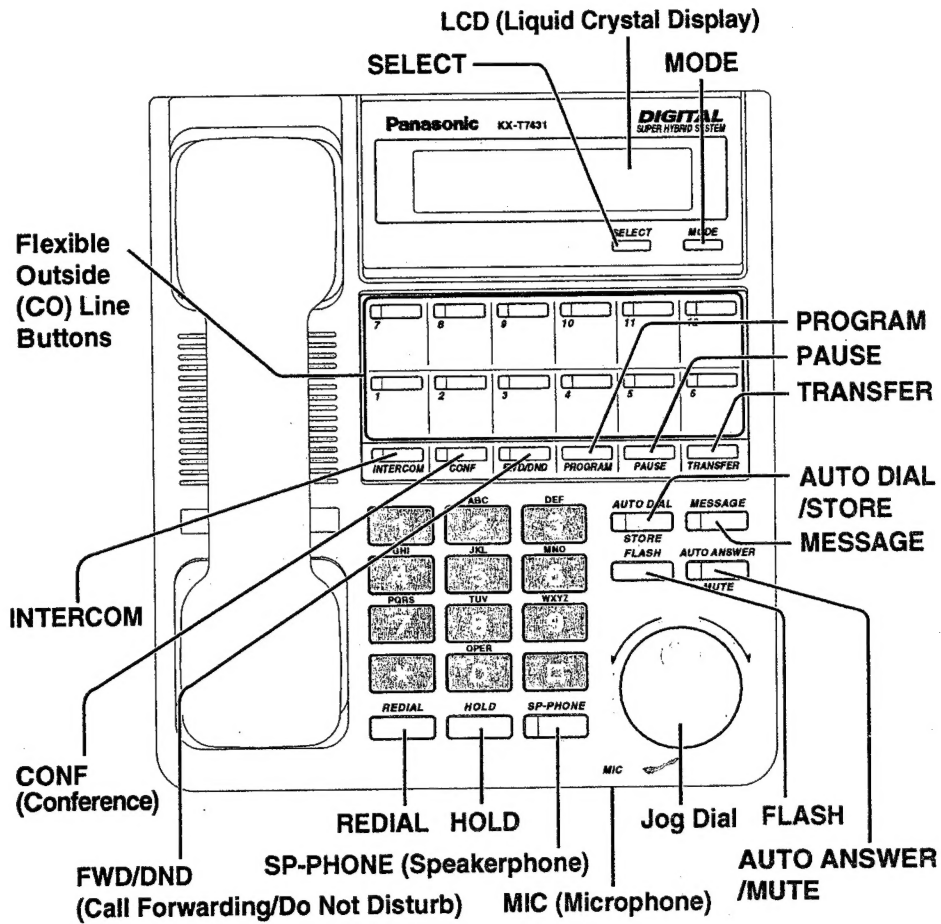
1. Note the following items when exchanging the LEDs (Ref. No. D100-117, 124-130) of Dial P.C. Board.

- 1) Do not reuse a LED which is removed from the P.C. Board.
- 2) Use a soldering iron (less than 15 W) for exchanging LED.
- 3) Do not heat the LED for more than 2 seconds.
- 4) Do not move the LED after soldering.

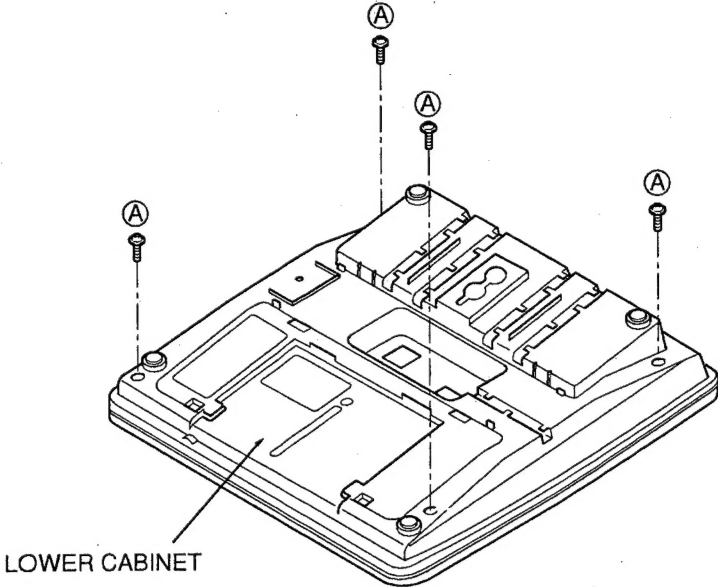
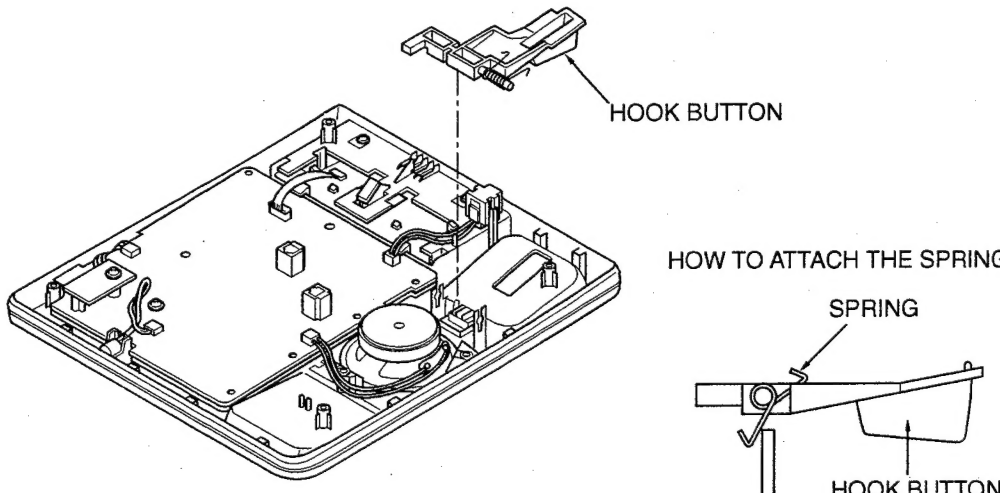
2. This unit employs the switch which is influenced by the light for the hook switch. When you open the cabinet to repair the unit in the bright light, the hook switch might work improperly. Therefore, take care not to shine the hook switch directly, or use the jig as shown below.



LOCATION OF CONTROLS



DISASSEMBLY INSTRUCTIONS

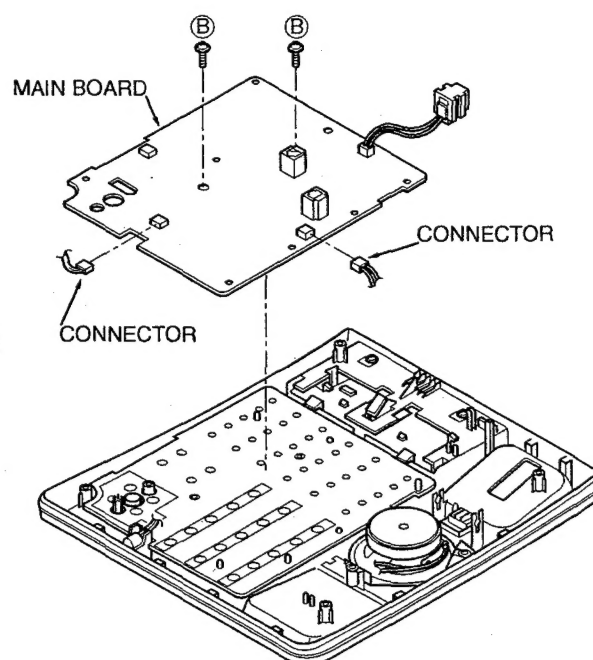
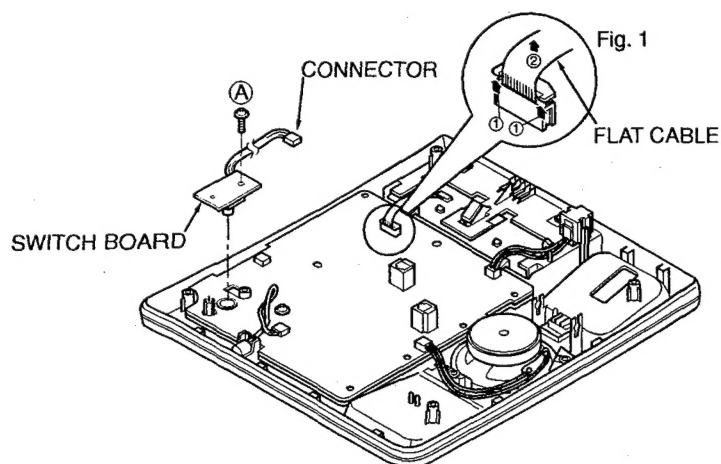
No. 1	HOW TO REMOVE THE LOWER CABINET
Procedure 1	<p>1) Remove the 4 screws (A).</p> <p>2) Remove the lower cabinet.</p>  <p>LOWER CABINET</p>
No. 2	HOW TO REMOVE THE HOOK BUTTON
Procedure 1→2	<p>1) Remove the hook button.</p>  <p>HOOK BUTTON</p> <p>HOW TO ATTACH THE SPRING</p> <p>SPRING</p> <p>HOOK BUTTON</p>

No. 3

HOW TO REMOVE THE SWITCH AND MAIN BOARDS

Procedure
1→2→3

- 1) Remove the screw (A).
- 2) Pull out the switch board connector.
- 3) Remove the switch board.
- 4) Pull out the flat cable. (See Fig. 1)
- 5) Remove the 2 screws (B).
- 6) Pull out the speaker and microphone connectors.
- 7) Remove the main board.

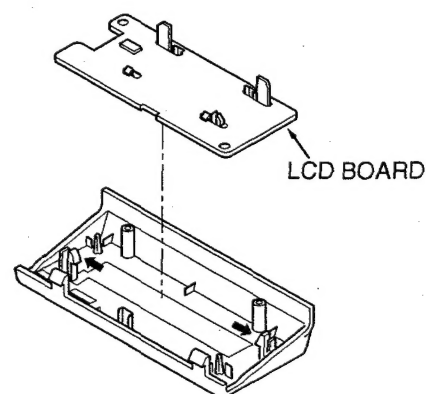
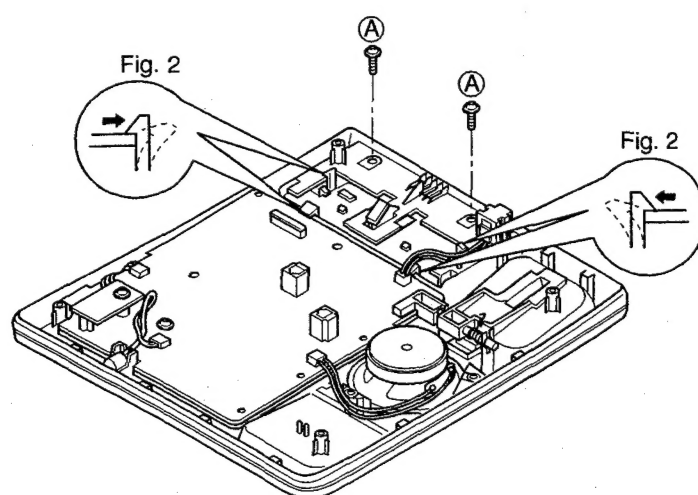


No. 4

HOW TO REMOVE THE LCD BOARD

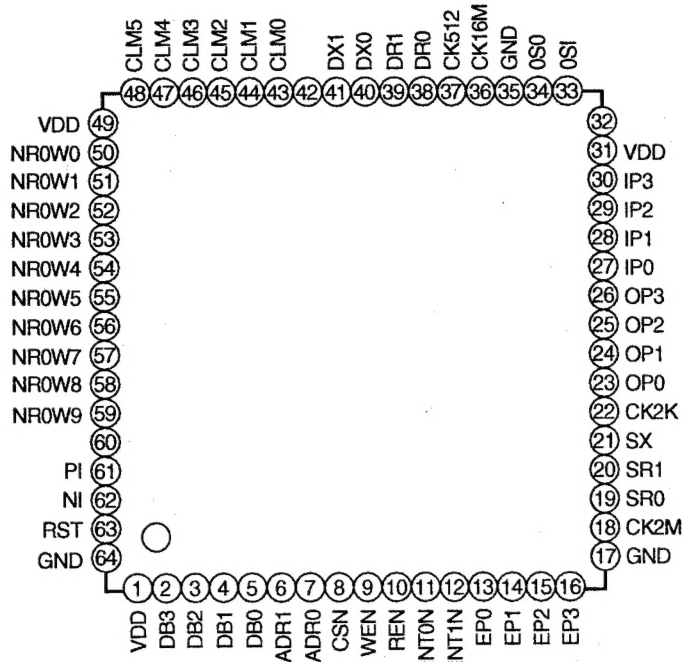
Procedure
1→4

- 1) Pull out the flat cable. (See Fig. 1)
- 2) Remove the 2 screws (A).
- 3) Remove the LCD block. (See Fig.2)
- 4) Remove the LCD board.



IC DATA

1. IC1

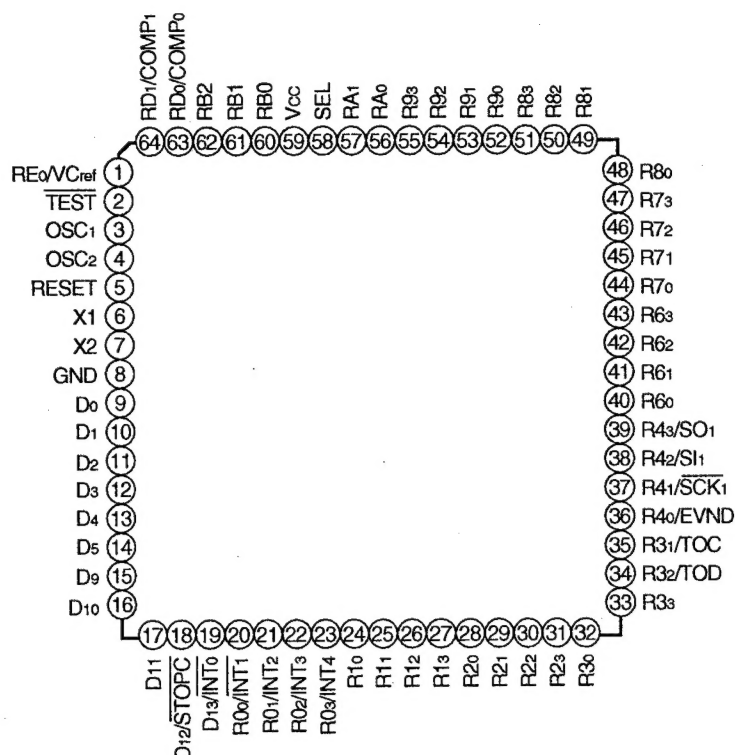


Name	Pin	Dir.	Pull Up	Type	Io	Act.	Block	MHz	Descriptions
DB3	2	bidir	---	TTL	8.0mA	high	PT5B03	2.0	Data Bus [3]
DB2	3	bidir	---	TTL	8.0mA	high	PT5B03	2.0	Data Bus [2]
DB1	4	bidir	---	TTL	8.0mA	high	PT5B03	2.0	Data Bus [1]
DB0	5	bidir	---	TTL	8.0mA	high	PT5B03	2.0	Data Bus [0]
ADR1	6	input	12-38k	TTL	---	high	PT5D01U	2.0	Address Bus [1]
ADR0	7	input	12-38k	TTL	---	high	PT5D01U	2.0	Address Bus [0]
CSN	8	input	---	TTL	---	low	PT5D01	1.0	Chip Select
REN	10	input	12-38k	TTL	---	low	PT5D01U	2.0	Read Enable Command
WEN	9	input	12-38k	TTL	---	low	PT5D01U	2.0	Write Enable Command
RST	63	input	---	CMOS schmidt	---	high	PC5D21	0.01	Asynchronous Reset Input
INT0N	11	output	---	CMOS	2.0mA	low	PC5O01	0.01	Interrupt Request
INT1N	12	output	---	CMOS	2.0mA	low	PC5O01	0.01	Interrupt Request
DR0	38	input	---	CMOS	---	low	PC5D01	0.6	Dpits Receive Data [1]
DR1	39	input	---	CMOS	---	low	PC5D01	0.6	Dpits Receive Data [0]
DX0	40	output	---	CMOS	4.0mA	low	PC5O02	0.6	Dpits Transmit Data [1]
DX1	41	output	---	CMOS	4.0mA	low	PC5O02	0.6	Dpits Transmit Data [0]
CK512K	37	output	---	CMOS	2.0mA	high	PC5O01	0.6	Dpits Bit Rate Clock
SR0	19	input	12-38k	TTL	---	high	PT5D01U	0.1	Serial Receive Data Stream [0]
SR1	20	input	12-38k	TTL	---	high	PT5D01U	0.1	Serial Receive Data Stream [1]
SX	21	output	---	CMOS	4.0mA	high	PC5O02	0.1	Serial Transmit Data Stream
CK2M	18	output	---	CMOS	4.0mA	high	PC5O02	2.1	Serial Stream Clock
EP0	13	output	---	CMOS	2.0mA	high	PC5O01	0.01	External Channel Pulse [0]
EP1	14	output	---	CMOS	2.0mA	high	PC5O01	0.01	External Channel Pulse [1]
EP2	15	output	---	CMOS	2.0mA	high	PC5O01	0.01	External Channel Pulse [2]

KX-T7431C/KX-T7431C-B

Name	Pin	Dir.	Pull Up	Type	Io	Act.	Block	MHz	Descriptions
EP3	16	output	---	CMOS	2.0mA	high	PC5O01	0.01	External Channel Pulse [3]
PI	61	input	---	CMOS schmidt	---	high	PC5D21	0.01	Rotary Encoder Input [Pos]
NI	62	input	---	CMOS schmidt	---	high	PC5D21	0.01	Rotary Encoder Input [Neg]
CLM0	43	output	---	CMOS	4.0mA	high	PC5O02	0.01	LED Column Drive [0]
CLM1	44	output	---	CMOS	4.0mA	high	PC5O02	0.01	LED Column Drive [1]
CLM2	45	output	---	CMOS	4.0mA	high	PC5O02	0.01	LED Column Drive [2]
CLM3	46	output	---	CMOS	4.0mA	high	PC5O02	0.01	LED Column Drive [3]
CLM4	47	output	---	CMOS	4.0mA	high	PC5O02	0.01	LED Column Drive [4]
CLM5	48	output	---	CMOS	4.0mA	high	PC5O02	0.01	LED Column Drive [5]
NROW0	50	output	---	CMOS	4.0mA	low	PC5O02	0.01	LED Row Drive [0]
NROW1	51	output	---	CMOS	4.0mA	low	PC5O02	0.01	LED Row Drive [1]
NROW2	52	output	---	CMOS	4.0mA	low	PC5O02	0.01	LED Row Drive [2]
NROW3	53	output	---	CMOS	4.0mA	low	PC5O02	0.01	LED Row Drive [3]
NROW4	54	output	---	CMOS	4.0mA	low	PC5O02	0.01	LED Row Drive [4]
NROW5	55	output	---	CMOS	4.0mA	low	PC5O02	0.01	LED Row Drive [5]
NROW6	56	output	---	CMOS	4.0mA	low	PC5O02	0.01	LED Row Drive [6]
NROW7	57	output	---	CMOS	4.0mA	low	PC5O02	0.01	LED Row Drive [7]
NROW8	58	output	---	CMOS	4.0mA	low	PC5O02	0.01	LED Row Drive [8]
NROW9	59	output	---	CMOS	4.0mA	low	PC5O02	0.01	LED Row Drive [9]
IP0	27	input	12-38k	CMOS	---	high	PC5D01U	0.01	Input Port [0]
IP1	28	input	12-38k	CMOS	---	high	PC5D01U	0.01	Input Port [1]
IP2	29	input	12-38k	CMOS	---	high	PC5D01U	0.01	Input Port [2]
IP3	30	input	12-38k	CMOS	---	high	PC5D01U	0.01	Input Port [3]
OP0	23	output		CMOS	4.0mA	high	PC5O02	0.01	Output Port [0]
OP1	24	output		CMOS	4.0mA	high	PC5O02	0.01	Output Port [1]
OP2	25	output		CMOS	4.0mA	high	PC5O02	0.01	Output Port [2]
OP3	26	output		CMOS	4.0mA	high	PC5O02	0.01	Output Port [3]
CK2K	22	output		CMOS	4.0mA	high	PC5O02	0.20	2kHz Clock Output (duty 25%)
CK16M	36	output	---	CMOS	2.0mA	high	PC5O01	16.4	Master Clock Out
OSI	33	input	---	Analog	---	---	PC5X02	16.4	X'tal In (XIN)
OSO	34	output	---	Analog	---	---	PC5X02	16.4	X'tal Out (XOUT)
N.C.	32								not used
N.C.	42								not used
N.C.	60								not used
VDD1	1	vdd							Vdd (5V)
VDD2	31	vdd							Vdd (5V)
VDD3	49	vdd							Vdd (5V)
VSS1	17	vss							Vss (GND)
VSS2	35	vss							Vss (GND)
VSS3	64	vss							Vss (GND)

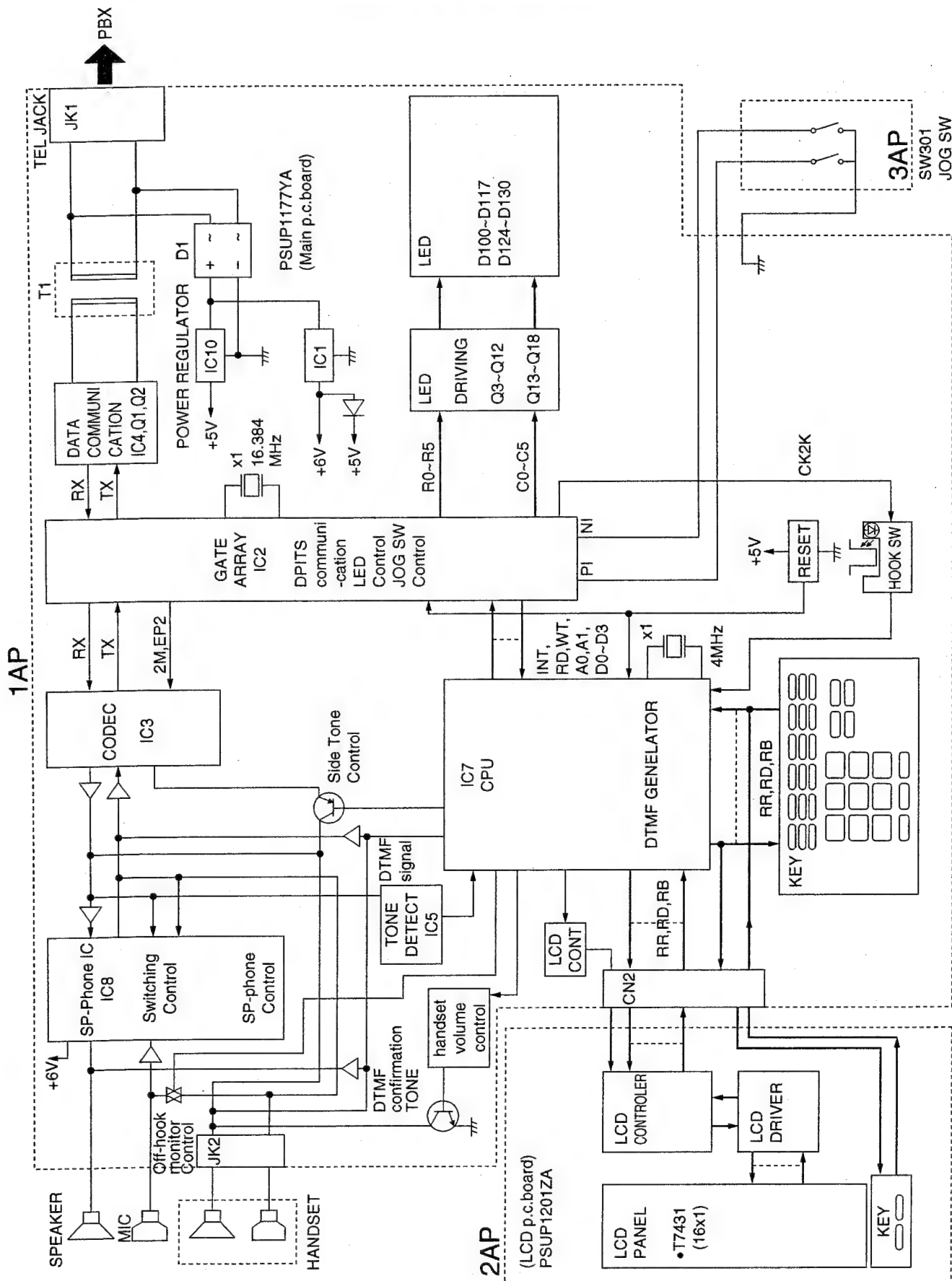
2. IC7



Classification	Terminal	Pin No.	Input/Output	Function
Power supply	Vcc	59		Power supply terminal
	GND	8		Ground terminal
Test	TEST	2	Input	Not the user's terminal. Connect to the Vcc terminal.
Reset	RESET	5	Input	Reset terminal for MCU
Oscillation	OSC1	3	Input	Input/output terminal to the main oscillator. Connect to the ceramic oscillator, crystal oscillator, or external oscillation circuit.
	OSC2	4	Output	
	X1	6	Input	Input/output terminal to the sub oscillator. Connect to the 32.768kHz crystal oscillator. If not, fix X1 terminal to Vcc and open X2 terminal.
	X2	7	Output	
Port	D0~D5 D9~D11	9~17	Input/Output	Input/output terminal which is addressed every 1 bit. The terminals D0~D3 are the source large current input/output terminal, which supplies the current of max. 10mA to each terminal. The terminals D4, D5, D9~D11 are sink large current input/output terminal, which supplies the current of max.15mA to each terminal.
	D12, D13	18,19	Input	Input terminal which is addressed every 1 bit.
	R00,~R43 R60,~RA1	20~57	Input/Output	Input/output terminal which is addressed every 4 bit.
	RB0~2, RD0~1, RE0	60~64, 1	Input	Input terminal which is addressed every 4 bit.
Interrupt	INT0, INT1, INT2~ INT4	19~23	Input	Input terminal for external interrupt .

Classification	Terminal	Pin No.	Input/Output	Function
Stop clear	STOPC	18	Input	Input terminal used for the transfer from stop mode to active mode
Serial interface	SCK ₁	37	Input/Output	Clock input/output terminal for serial interface.
	SI ₁	38	Input	RX data input terminal for serial interface.
	SO ₁	39	Output	TX data output terminal for serial interface.
Timer	TOC, TOD	35, 34	Output	Timer output terminal.
	EVND	36	Input	Event input terminal.
Voltage comparator	COMP ₀ , COMP ₁	63, 64	Input	Analog input terminal for comparator.
	VCref	1		Reference level voltage terminal for threshold voltage of analog input terminal.
Divide ratio selection	SEL	58	Input	The terminal which selects the divide ratio of system clock right after the reset and when returned to active mode from stop mode. Connect to Vcc voltage when selecting the divide-by-4, and connect to GND voltage when selecting the divide-by-32.

BLOCK DIAGRAM



CIRCUIT OPERATIONS

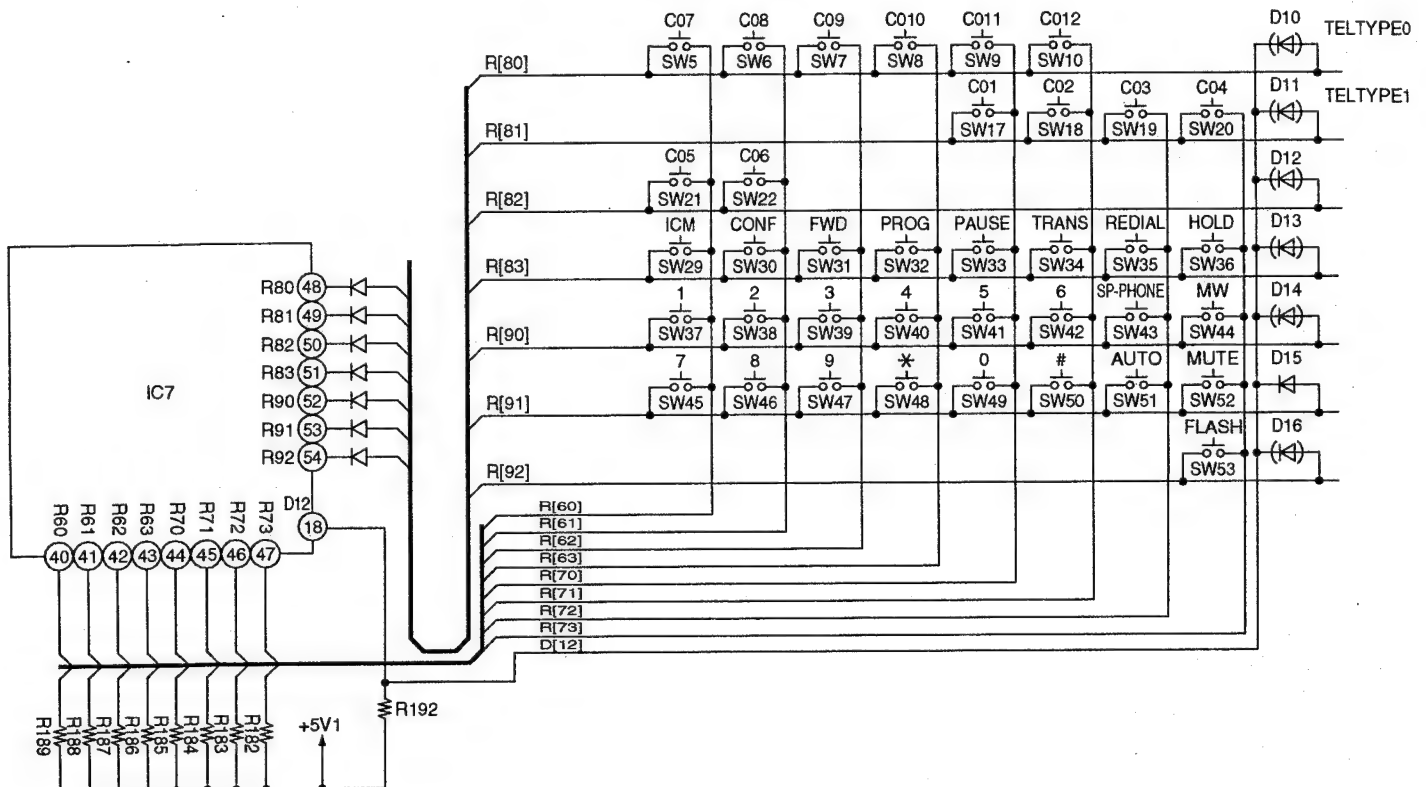
1. KEY INPUT CONTROL CIRCUIT

1) Circuit Operation

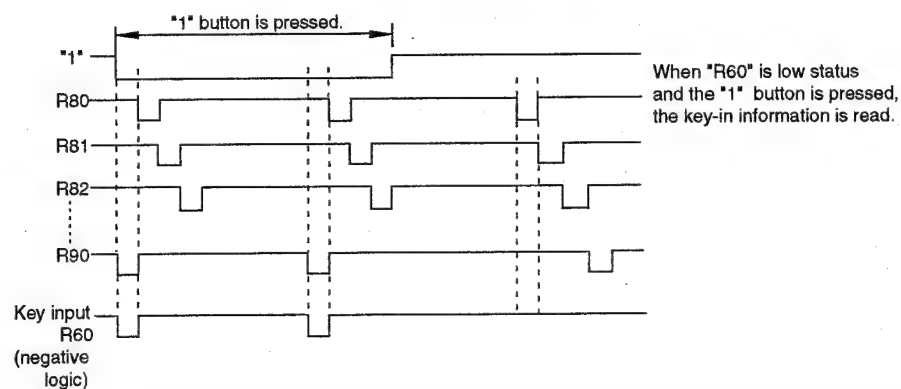
Sequential input information (negative logic) from the DSHS proprietary telephone is executed by dynamic scanning. The ports R80 to R83, R90, R91 and R92 of IC7 are brought to low status consecutively.

If a key is pressed, the key-in information input is executed by ports R60 to R63 and R70 to R73.

Circuit Diagram



Key Input Control Timing Chart



2. LCD CONTROL CIRCUIT

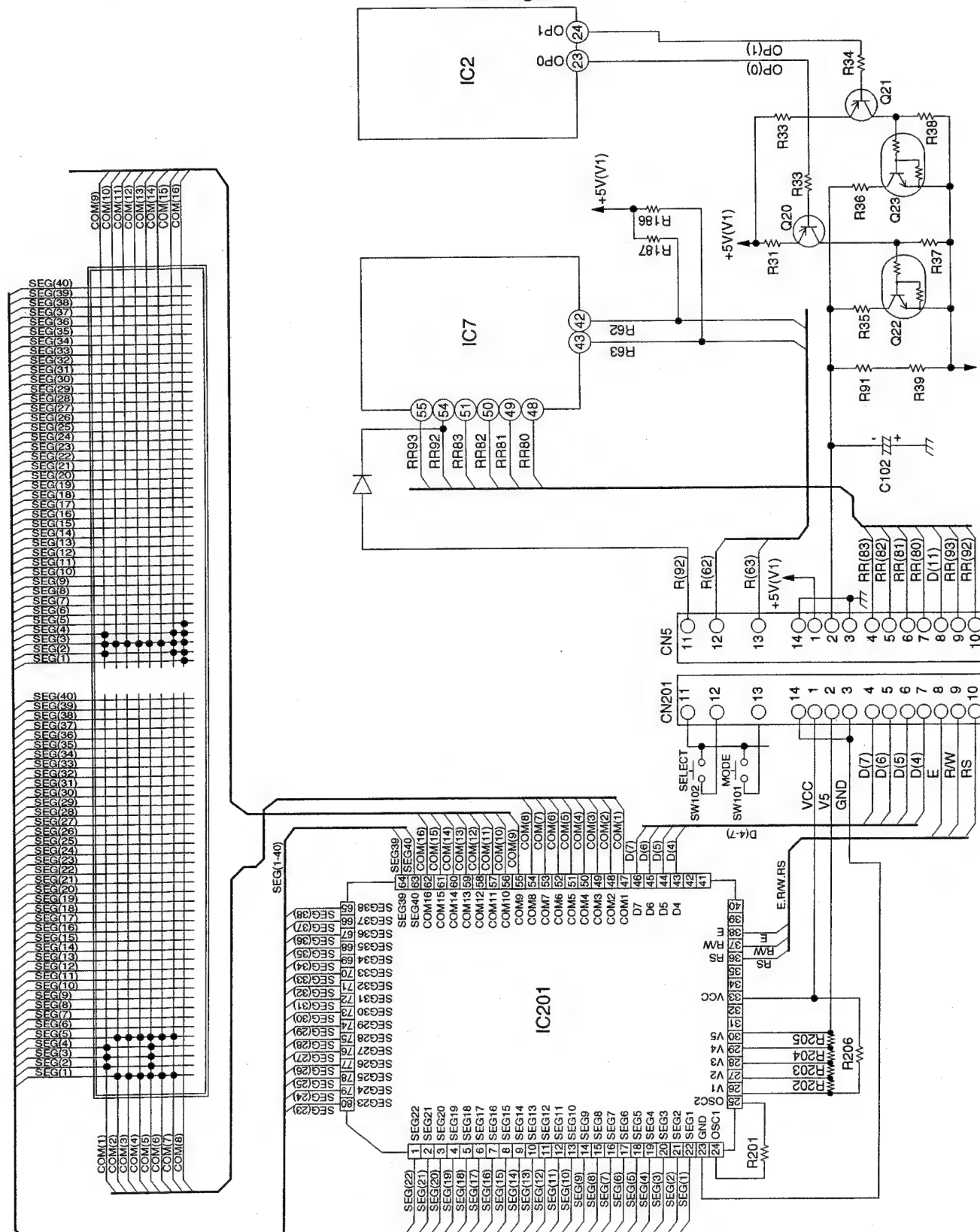
1) Circuit Operation

The LCD data is output from pins 48 to 55 of IC7.

LCD contrast adjustment is performed by the circuit composed of Q22, Q23, R91, R35 and R36.

The contrast is determined only by the voltage level between V5 of IC201 and +5 V. Higher potential makes the contrast high.

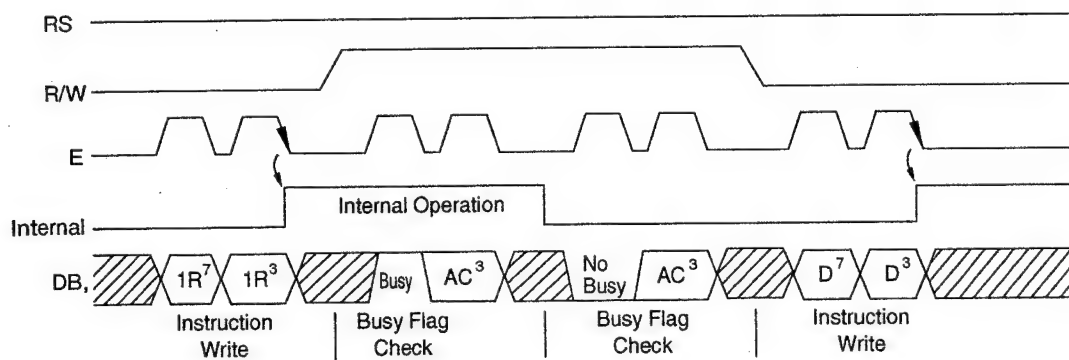
Circuit Diagram



LCD Contrast Control

CONTRAST	IC2 Pin 23	IC2 Pin 24
HIGH	H	L
MIDDLE	L	H
LOW	H	H

4-bit Data Transfer Timing Sequence



(Note) IR7, IR3 : Instruction 7th bit, 3rd bit
AC3 : Address Counter 3rd bit

3. LED CIRCUIT

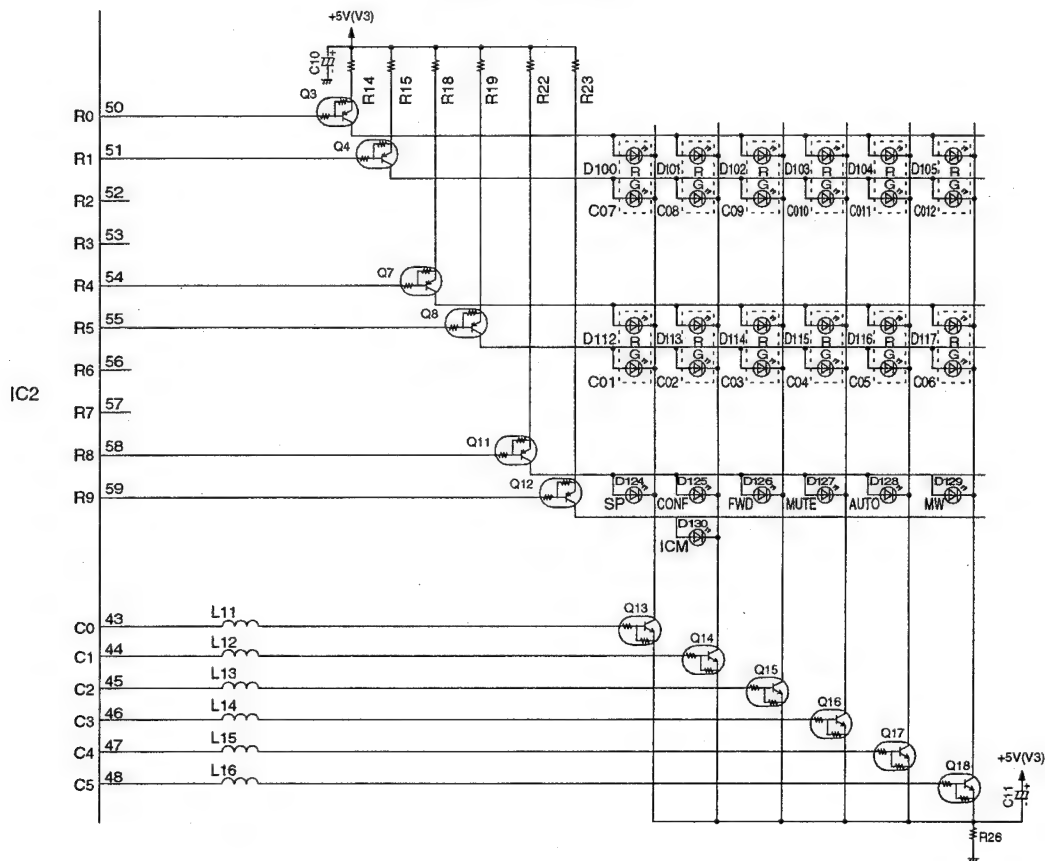
1) Circuit Operation

The LED executes dynamic lighting for the status indicators, and control is executed by the output ports C0 to C5 (column) and R0, R1, R4, R5, R8 and R9 (row) of IC2.

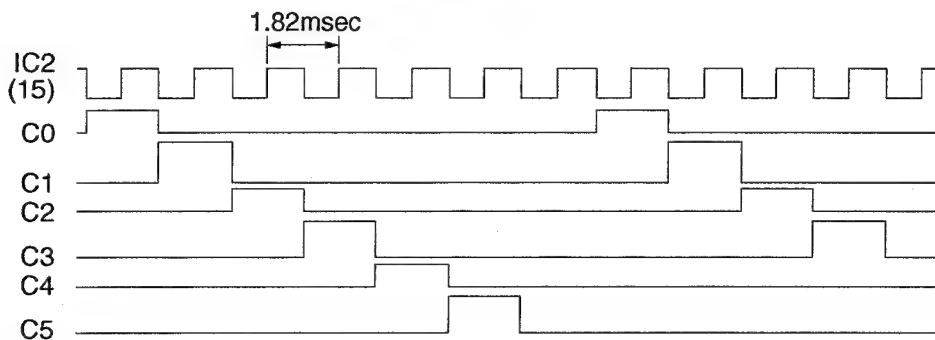
A fixed pulse ($T=1.82$ msec) is output continuously from IC2. This pulse is counted and the output of IC2 is shifted sequentially from C0 to C5.

R0, R1, R4, R5, R8 and R9 of IC2 also output pulses, and the lighting of the LED is controlled by the timing of the output ports C0 to C5.

Circuit Diagram



Timing Chart



4. DATA COMMUNICATION CIRCUIT

1) Function

The data communication circuit serves the following functions:

Information exchanger between the DSHS and DSHS proprietary telephone, key input information as well as data for the LED control, LCD control, etc. This information is continuously exchanged at all times.

2) Circuit Operation

When the DSHS proprietary telephone receives an IRQ signal from the DSHS and after sending the key input information to the DSHS and receiving data for the LED control, etc., the DSHS proprietary telephone will return to the DSHS an acknowledge signal.

3) Reception

The data from the EMSS is received via the H and L lines along the path shown below.

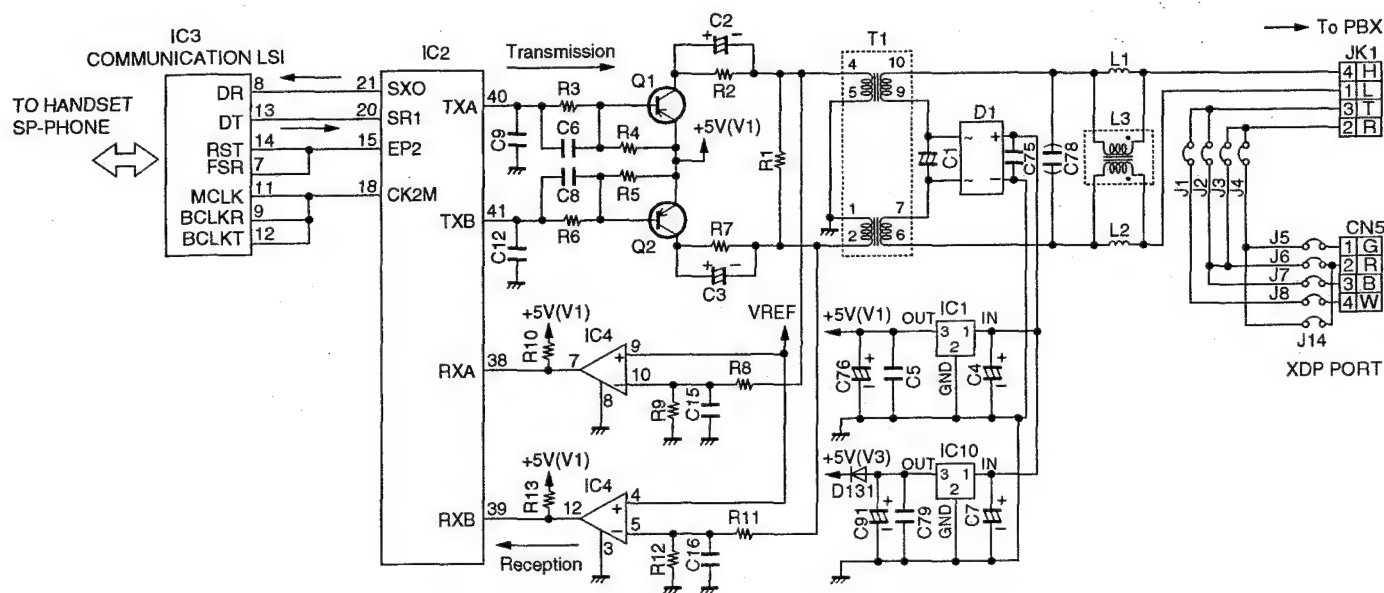
H, L Line → T1 → IC4 Pin 5, 10 → IC2 Pin 38, 39 → IC2 Pin 21 → IC3 Pin 8

4) Transmission

The data to the EMSS proprietary telephone is transmitted along the following path.

IC3 Pin 13 → IC2 Pin 20 → IC2 Pin 40, 41 → Q1, Q2 → T1 → H, L Line

Circuit Diagram

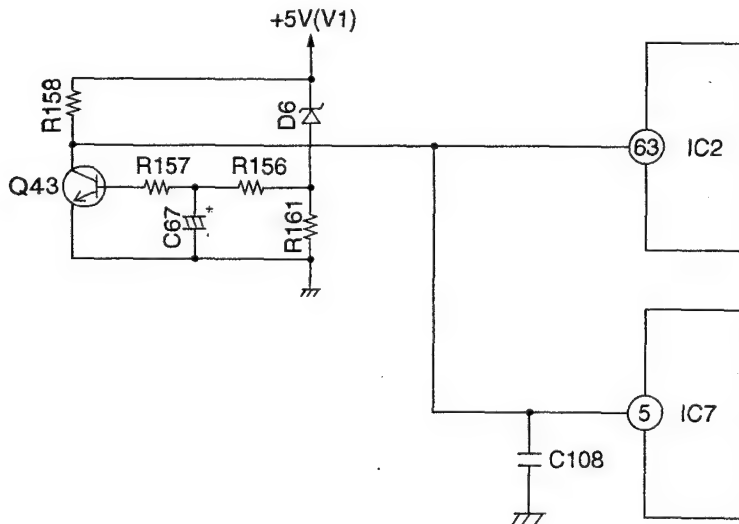


5. RESET CIRCUIT

1) Circuit Operation

This circuit is used for transmission of a reset pulse to the CPU (IC7) at the following times, connecting the telephone line jack and circuit operation.

Circuit Diagram



Power ON

Q43 OFF

The reset signal goes up with the power voltage.

D6 Zener Diode ON

Charging C67 is started.

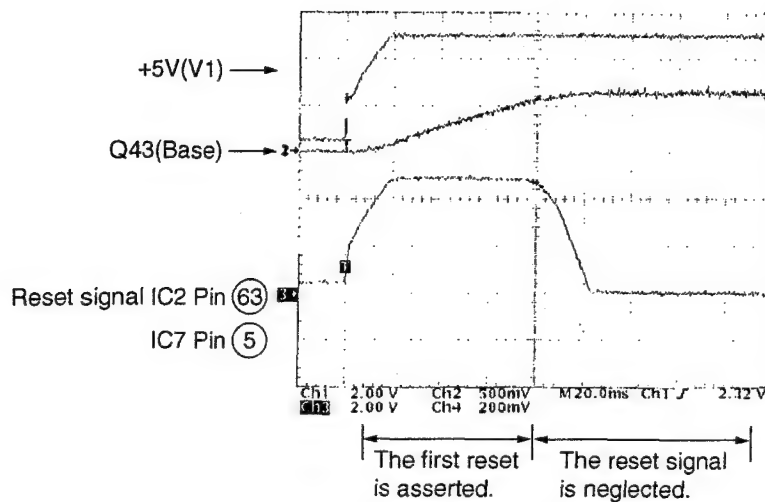
The base voltage of Q43 goes up.

Reset signal is asserted

Q43 ON

The reset signal is neglected.

Timing Chart

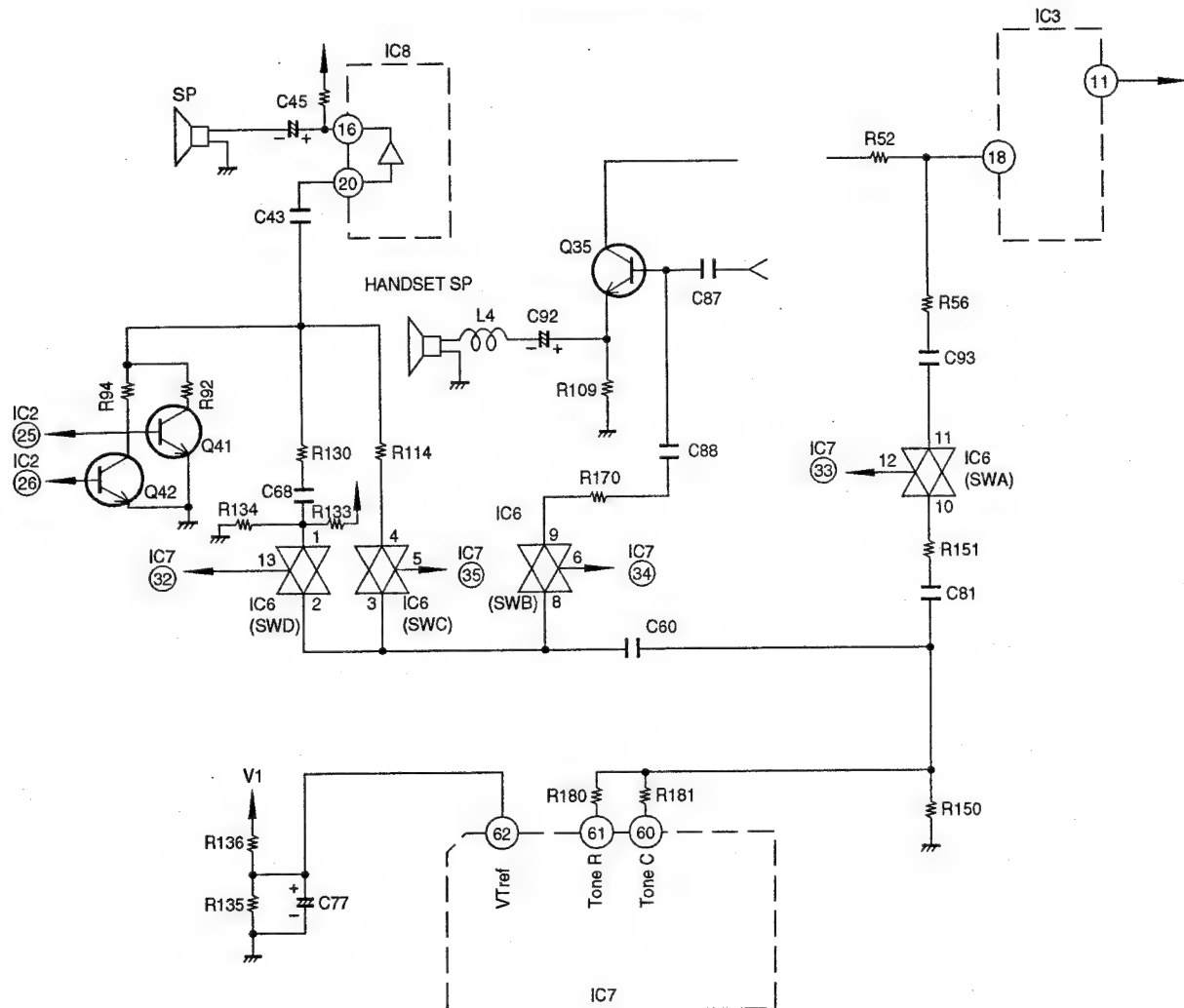


6. TONE GENERATION CIRCUIT

1) Function

All system tones including COL, extension, busy, DTMF signal and key-in tones are sent from Pins 61 and 60 of IC7 and controls the path by the Analog Switch (IC6).

Circuit Diagram



2) Calling Tones from COL and EXT.

For a calling tone from a CO line or extension, the single row tone signal is output from Pin 61 of IC7 and the tone volume is controlled by transistors Q41 and Q42.

IC7 Pin 61 → IC6 Pin 2-1 → C43 → IC8 Pin 20 → IC8 Pin 16 → C45 → SP

Ringer Volume Control

Level Transistor	OFF	LOW	MIDDLE	HIGH
Q41	ON	ON	OFF	OFF
Q42	ON	OFF	ON	OFF

KX-T7431C/KX-T7431C-B**3) Busy Station Calling Tone**

852 Hz and 697 Hz signals are output from Pin 61 of IC7 alternately at intervals of 60 ms.
The signal flow is shown below.

IC7 Pin 61 → IC6 Pin 3~4 → R114 → C43 → IC8 Pin 20 → IC8 Pin 16 → C45 → SP

4) DTMF Signal

A DTMF tone is generated by IC7 and the signal flow is shown below.

(To Telephone Line)
 IC7 Pin 60,61 (To Monitor) → IC6 Pin 10~11 → R56 → IC3 Pin 18 → Telephone Line
 → IC6 Pin 8~9 → R170 → C88 → Q35 → C92 → Handset Speaker
 (IC6 Pin 3~4 → R114 → C43 → IC8 Pin 20 → IC8 Pin 16 → C45 → SP)

DTMF Frequency Table

		High Group (IC7 Pin 77)		
		1209 Hz	1336 Hz	1477 Hz
Low Group (IC9 Pin 78)	697 Hz	1	2	3
	770 Hz	4	5	6
	852 Hz	7	8	9
	941 Hz	*	0	#

5) Key-in Tone

An 852 Hz single tone is used as the key-in tone. A tone is generated from IC7 and is heard at the speaker.
The signal flow is shown below.

IC7 Pin 61 → IC6 Pin 8~9 → R170 → C88 → Q35 → C92 → Handset Speaker
 → IC6 Pin 3~4 → R114 → C43 → IC8 Pin 20 → IC8 Pin 16 → C45 → SP

CONDITION	IC6 SWA	IC6 SWB	IC6 SWC	IC6 SWD
Ringing	OFF	OFF	OFF	ON
Call Waiting	OFF	OFF	ON	OFF
Tone Dial (Handset)	ON	ON	OFF	OFF
Tone Dial (Speakerphone)	ON	OFF	ON	OFF

7. HANDSET CIRCUIT

1) Transmission Signal Path

The analog input signal for the handset microphone is changed to a digital signal and sent through the telephone line via the following path:

Handset MIC → L5 → IC11 Pin 4~3 → C85 → R103 → C84 → Q33 → R124 → C80 → R52 → IC3 → IC2 → R3,R6 → Q1,Q2 → R2,R7 → T1 → Telephone Line

2) Reception Signal Path

The digital input signal from the telephone line is changed to an analog signal by IC3 and sent to the receiver via the following path:

Telephone Line → T1 → R8,R11 → IC4 Pin 10, 5 → IC2 → IC3 → R106 → C86 → C87 → Q35 → C92 → L4 → Handset Speaker

3) Circuit diagram for transmission / reception signal path.

Refer to page 35.

8. SPEAKERPHONE CIRCUIT

1) Function

This circuit controls the automatic switching of the transmitted and received signals to and from the telephone line, when the unit is used in the hands-free mode.

2) Circuit Operation

The speakerphone can only provide a one-way communication path.

In other words, it can either transmit an outgoing signal or receive an incoming signal.

This switching circuit is contained in IC8 and consists of a Voice Detector, Tx Attenuator, Rx Attenuator, Comparator and Attenuator Control. The circuit analyzes whether the Tx (transmit) or Rx (receive) signal is louder, and then it processes the signals so that the louder signal is given precedence.

The Voice Detector provides a DC input to the Attenuator Control corresponding to the Tx signal. The Comparator receives a Tx and Rx signal, and supplies DC input to the Attenuator Control corresponding to the Rx signal. The Attenuator Control provides a control signal to the Tx and Rx Attenuator to switch the appropriate signals ON and OFF. The Attenuator Control also detects the level of the volume control to automatically adjust the volume for changing ambient conditions.

3) Control Signal Path

Control signals for transmission and reception are input to IC8 via the following path:

(Transmission Control Signal Path)

MIC → IC8 Pin 9 → IC8 Pin 10 → IC8 Pin 3 → IC8 Pin 4 → IC8 Pin 5

(Reception Control Signal Path)

D1/D2 Line → IC3 Pin 4 → R63 → IC8 Pin 7

KX-T7431C/KX-T7431C-B

4) Transmission/Reception Switching

The comparison result between Tx and Rx output is a DC level at IC8 Pin 23.

Tx level is high Pin 23=Pin 20-6mV

Rx level is high Pin 23=Pin 20-150mV

The comparator output is connected to the attenuator control inside IC8.

5) Voice Detector

The output of the mic amp (Pin 10 of IC8) is supplied to Pin 13 of IC8 as a control signal for the voice detector.

6) Attenuator Control

The attenuator control detects the setting of the volume control through Pin 24 of IC8 and automatically adjusts the volume for changing ambient conditions.

7) Transmission Signal Path

The input signal from the microphone is sent through the circuit via the following path:

MIC → C55 → IC11 Pin 8~9 → C65 → IC8 Pin 9 → IC8 Pin 10 → R121 → C54 → IC8 Pin 3 → IC3 Pin 4 → R71 → C31 → R52 → IC3 Pin 18 → IC2 Pin 20 → D1/D2 Line

8) Reception Signal Path

Signals received from the telephone line are output to the speaker via the following path:

D1/D2 Line → IC2 Pin 21 → IC3 Pin 4 → R45 → C30 → R63 → C37 → IC8 Pin 29 → IC8 Pin 28 → R67 → C42 → C43 → IC8 Pin 20 → IC8 Pin 16 → C45 → SP

9) Busy Tone Detector circuit

The busy tone detection for the automatic redialing is executed as follow:

D1/D2 Line → IC2 Pin 21 → IC3 Pin 4 → C28 → IC5 Pin 6, 7 → IC5 Pin 2 → D7 → Q45 → IC7 Pin 64

10) OFF-HOOK Monitor Circuit

The input signal from the handset microphone is output through the speakerphone circuit.

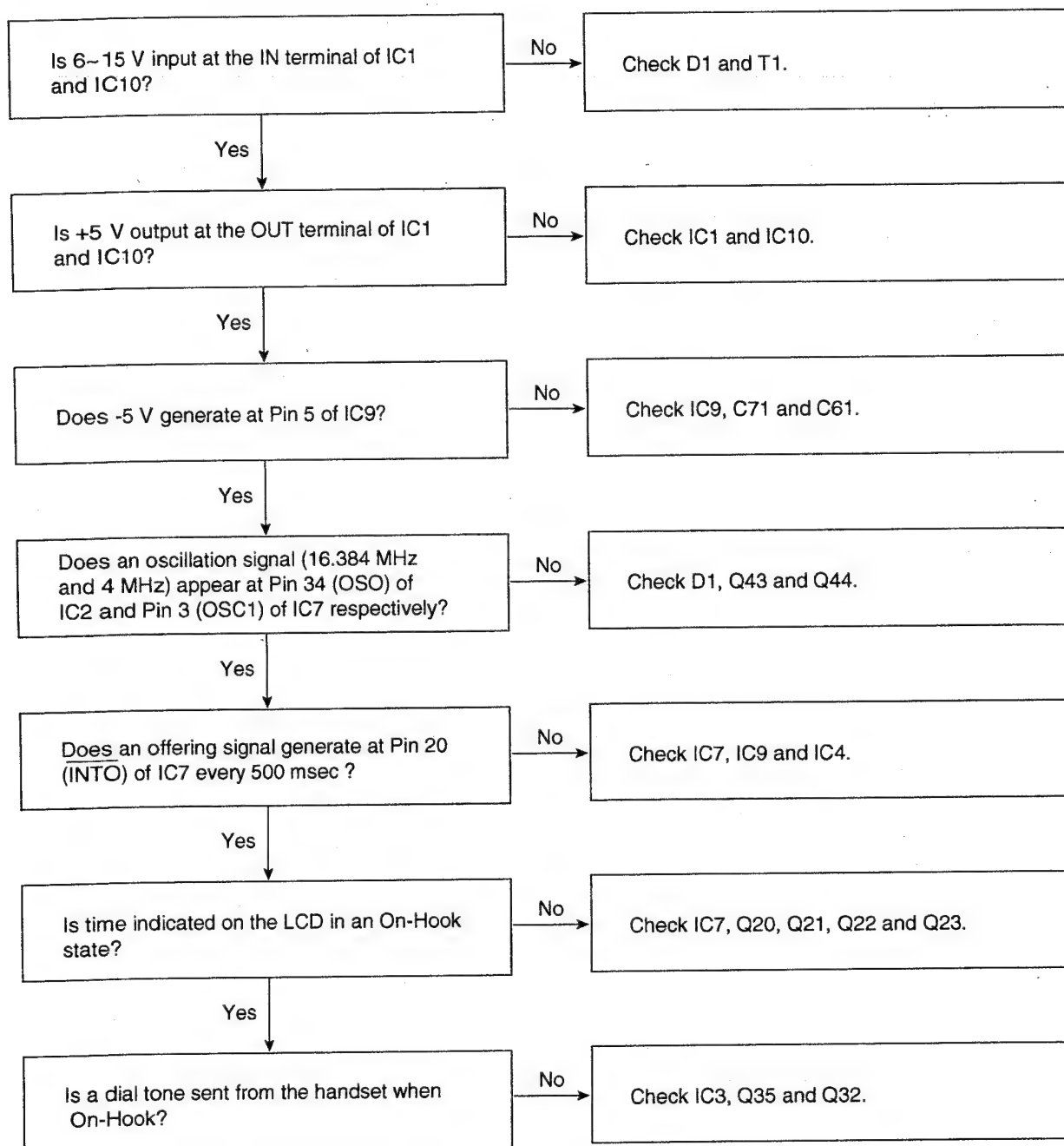
Handset MIC → L5 → R197 → C97 → IC11 Pin 10~11 → C65 → IC8 Pin 9 → IC Pin 10 → R121 → C54 → IC8 Pin 3 → IC8 Pin 4 → R71 → C31 → R52 → IC3 Pin 18 → IC2 Pin 20 → D1/D2 Line

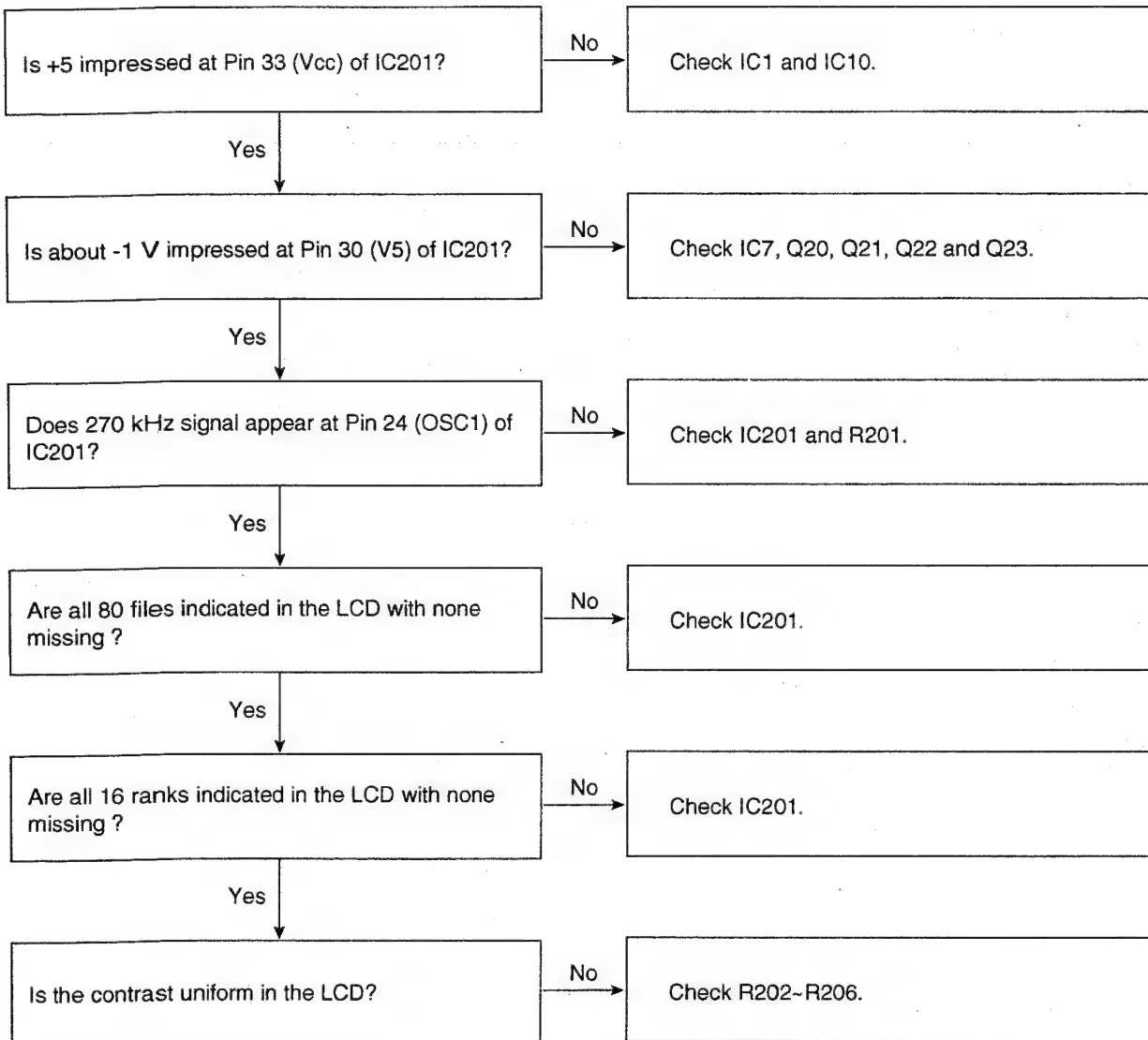
11) Circuit Diagram for signal path

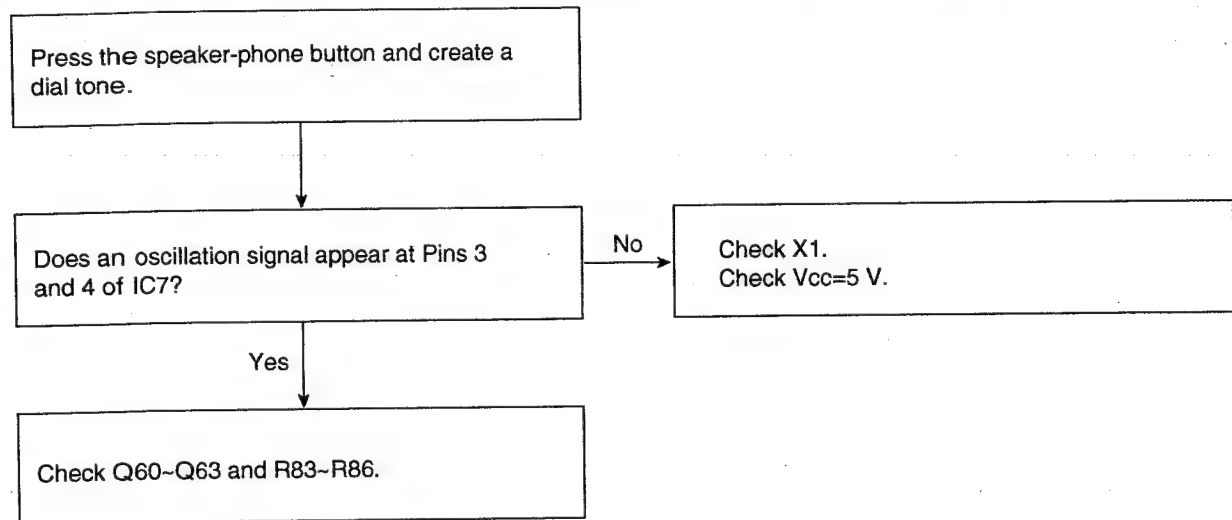
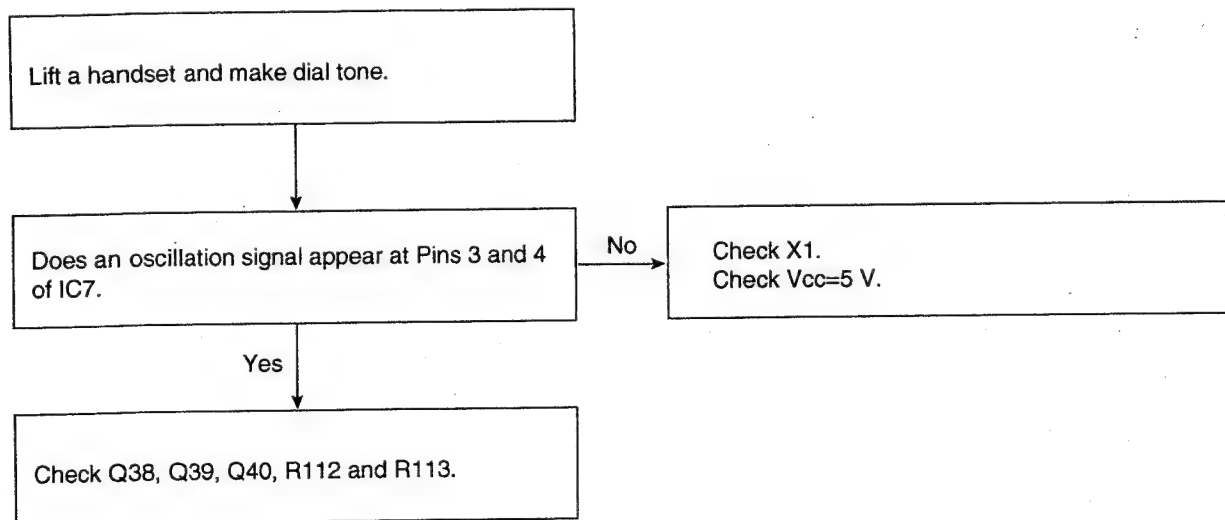
Refer to page 35.

TROUBLESHOOTING GUIDE

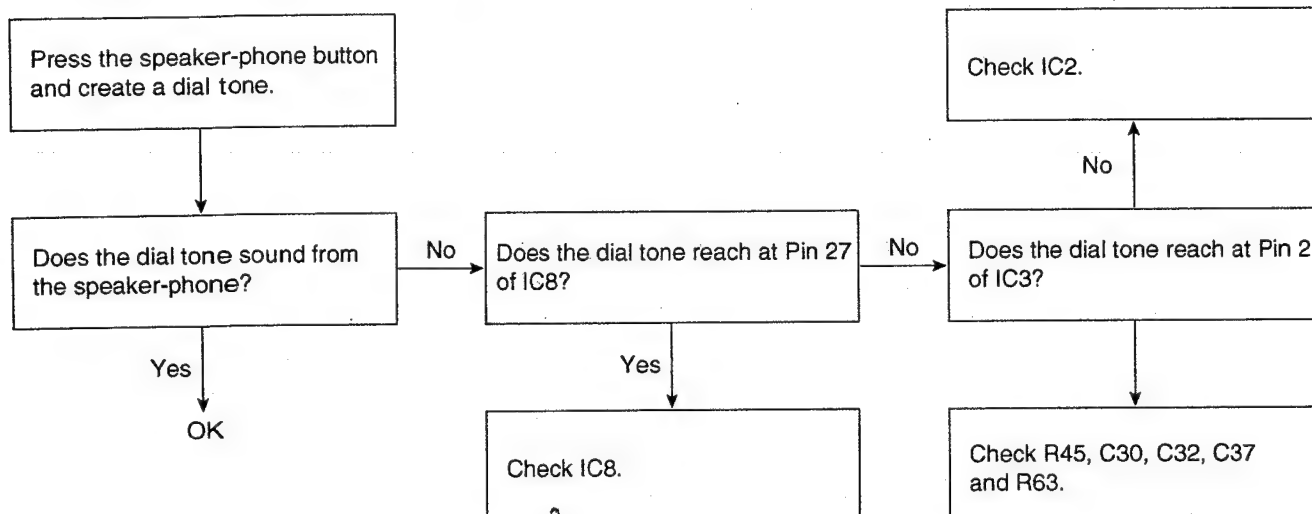
1. NO OPERATION.



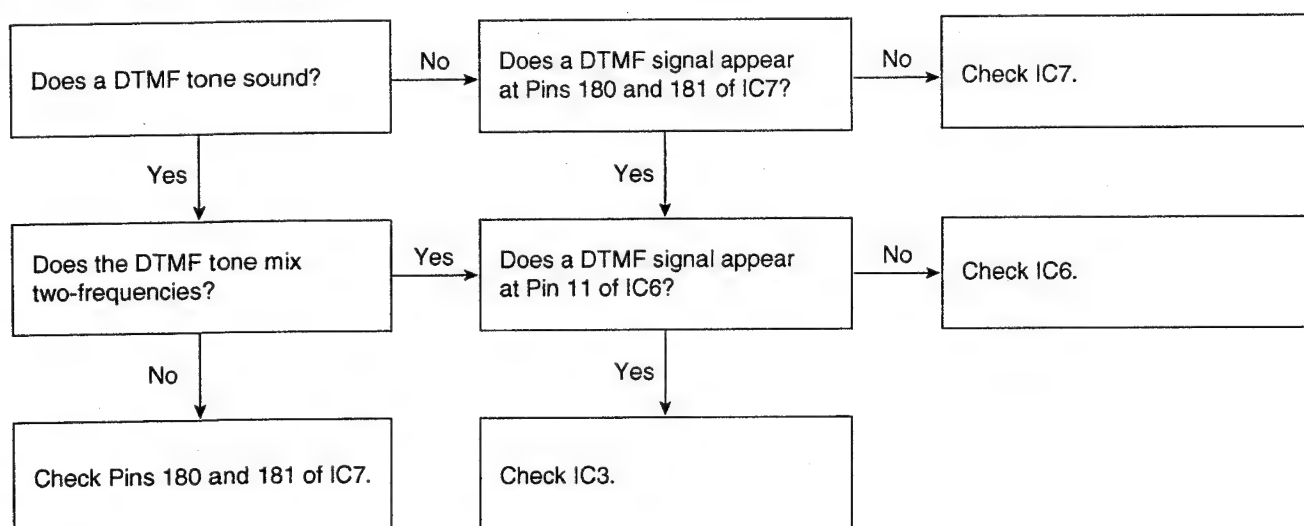
2. THE LCD DOES NOT OPERATE.

3. THE ELECTRONIC VOLUME OF THE SPEAKER-PHONE DOES NOT WORK.**4. THE ELECTRONIC VOLUME OF THE HANDSET DOES NOT WORK.**

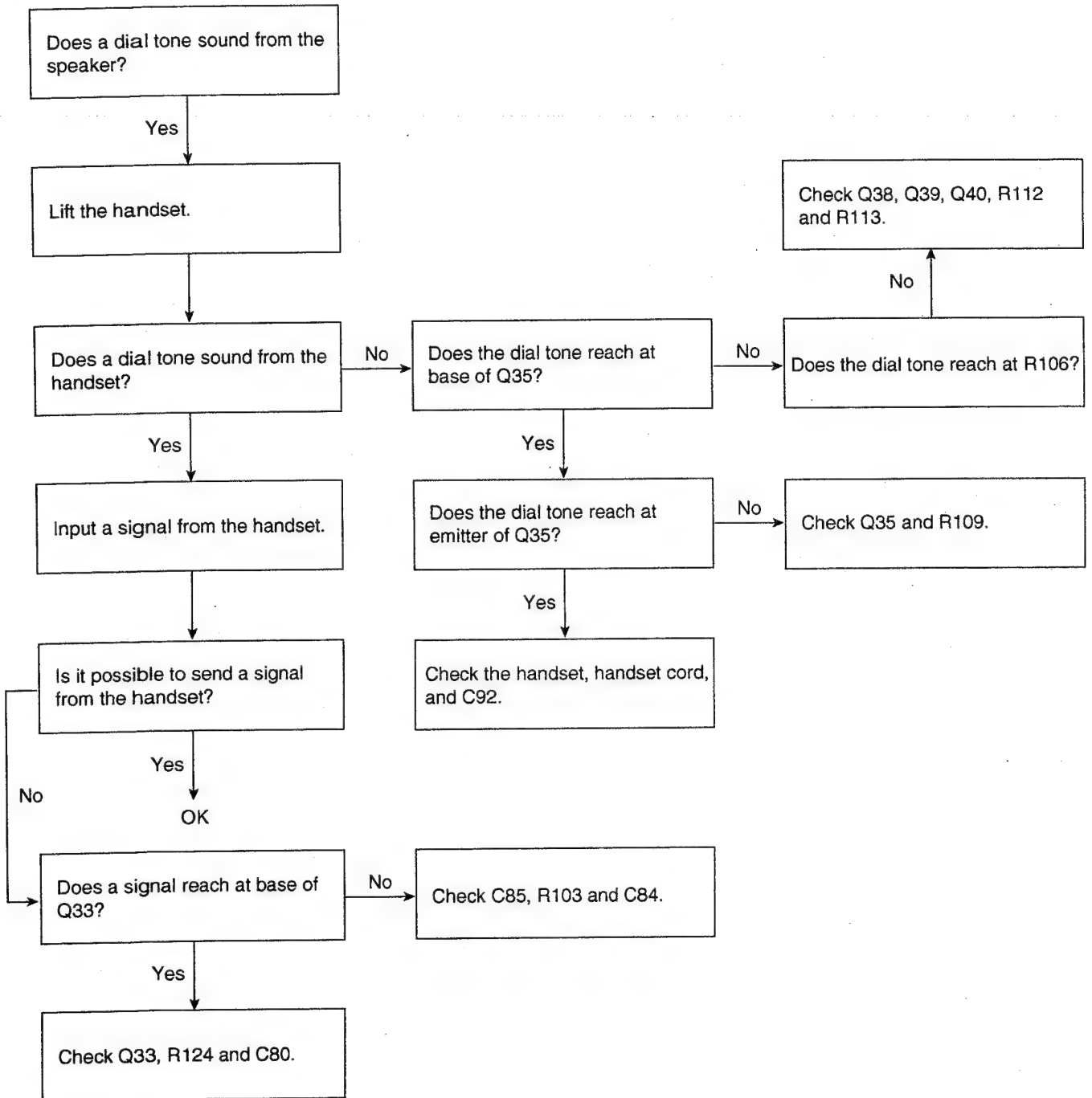
5. SPEAKER-PHONE TROUBLE.



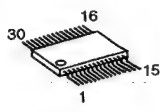
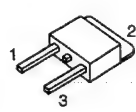
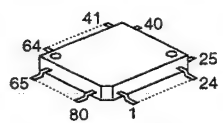
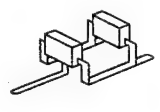
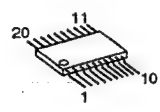
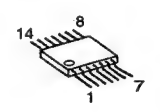
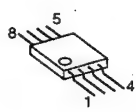
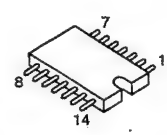
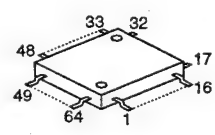
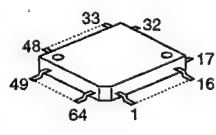
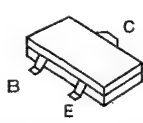
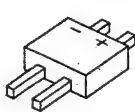
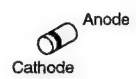
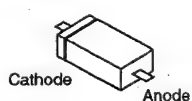
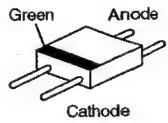
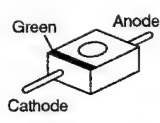
6. TONE DIAL TROUBLE.



7. HANDSET TROUBLE.



TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES

 <p>PQVISC77655V</p>	 <p>PSVIBA06FP PSVIBA05FP</p>	 <p>PSVI44780B24</p>	 <p>PSVII24019T1</p>	 <p>PSVIMC5480DW</p>
 <p>PQVINJM319V</p>	 <p>PQVINJM2904F PQVINJU7660M</p>	 <p>PQVITC4066BF</p>	 <p>PSVIBU65050D</p>	 <p>PSVI4668A07H</p>
 <p>2SA1576Q, PQVTFB1J3P PQVTDTA143XU, UN5213 PQVTDTD133HK, 2SC4081Q</p>		 <p>PQVDS1ZB60F1</p>	 <p>RLS71</p>	 <p>PSVDUDZ39B PSVDUDZ68B</p>
 <p>PQVDPY1204</p>	 <p>PQVDBR1102W PQVDPY1102</p>			

HOW TO REPLACE THE FLAT PACKAGE IC

If you do not have the special tools (for example: SPOT HEATER) to remove the SPOT HEATER'S Flat IC, if you have solder (large amount) a soldering iron and a cutter knife, you can easily remove IC's even though large than 100 pin.

1. PREPARATION

- SOLDER - - - - - Sparkle Solder 115A-1, 115B-1
OR
Almit Solder KR-19, KR-19RMA
- Soldering iron - - - - - Recommended power consumption is between 30 W to 40 W.
Temperature of Copper Rod $662 \pm 50^{\circ}\text{F}$ ($350 \pm 10^{\circ}\text{C}$)

(An expert may handle a 60~80 W iron, but a beginner might damage the foil by overheating.)
- Flux - - - - - HI115 Specific gravity 0.863

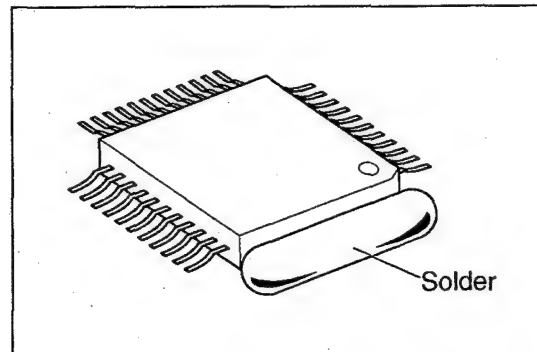
(Original flux should be replaced daily.)

2. FLAT PACKAGE IC REMOVE PROCEDURE

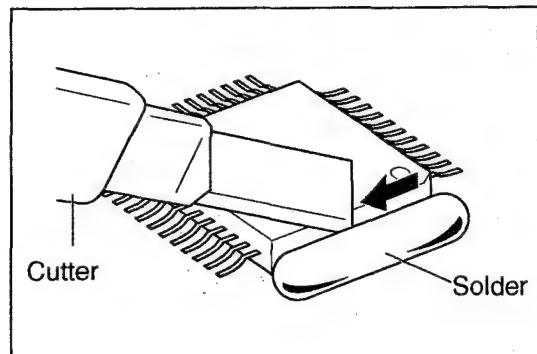
- 1) When all of the IC lead can not been seen at the standard degree, fill with large quantities of solder.

Note:

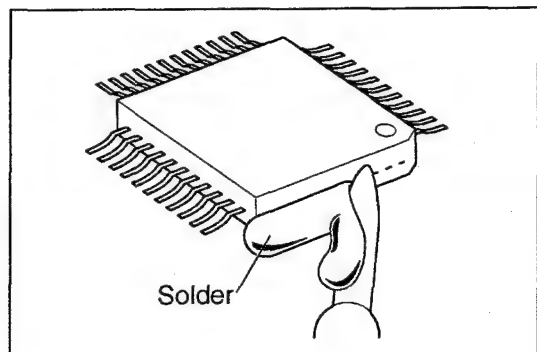
If you do not fill with solder and directly cut the IC lead with the cutter, stress may build up directly in the P.C.board's pattern. If you do not fill with large quantities of solder as in step 1 the P.C.board pattern may be removed.



- 2) Using a cutter, cut the lead at the source.
(Cut the contents with the cutter lightly 5 or 6 times.)



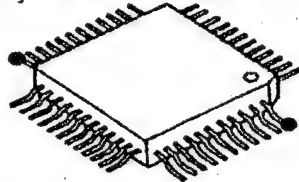
- 3) Remove when the solder melts.
(Remove the lead at the same time.)



After removing the Flat IC and when attaching the new IC, remove any of the excess solder on the land using the soldering wire, etc. If the excess solder is not removed from the land, the IC will slip and not be attached properly.

3. FLAT PACKAGE IC INSTALLATION PROCEDURE

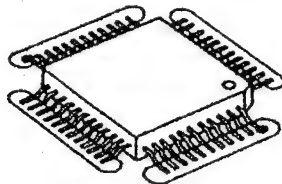
- 1) Temporarily fix the FLAT PACKAGE IC by soldering on the two marked pins.



● - - - - - Temporary soldering point.

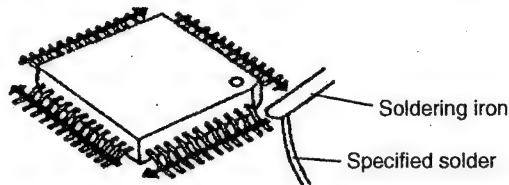
*Check the accuracy of the IC setting with the corresponding soldering foil.

- 2) Apply flux to all pins of the FLAT PACKAGE IC.



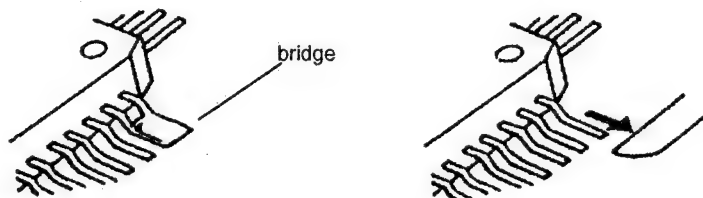
○ - - - - - Flux

- 3) Solder using the specified solder, in the direction of the arrow, by sliding the soldering iron.



4. BRIDGE MODIFICATION PROCEDURE

- 1) Lightly re-solder the bridged portion.
- 2) Remove the remaining solder along the pins using a soldering iron as shown in the figure below.

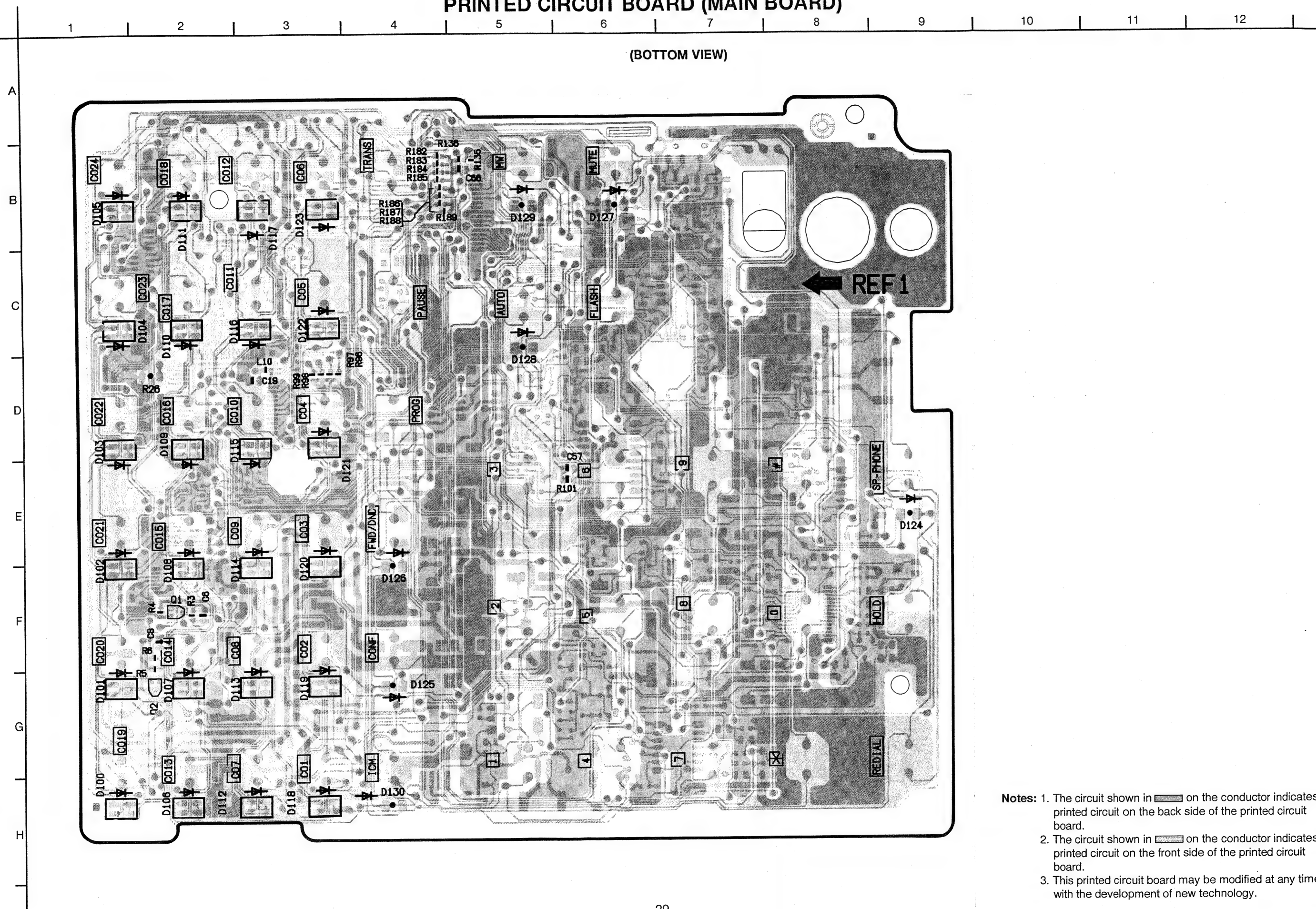



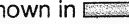
KX-T7431C/KX-T7431C-B

KX-T7431C/KX-T7431C-B

PRINTED CIRCUIT BOARD (MAIN BOARD)

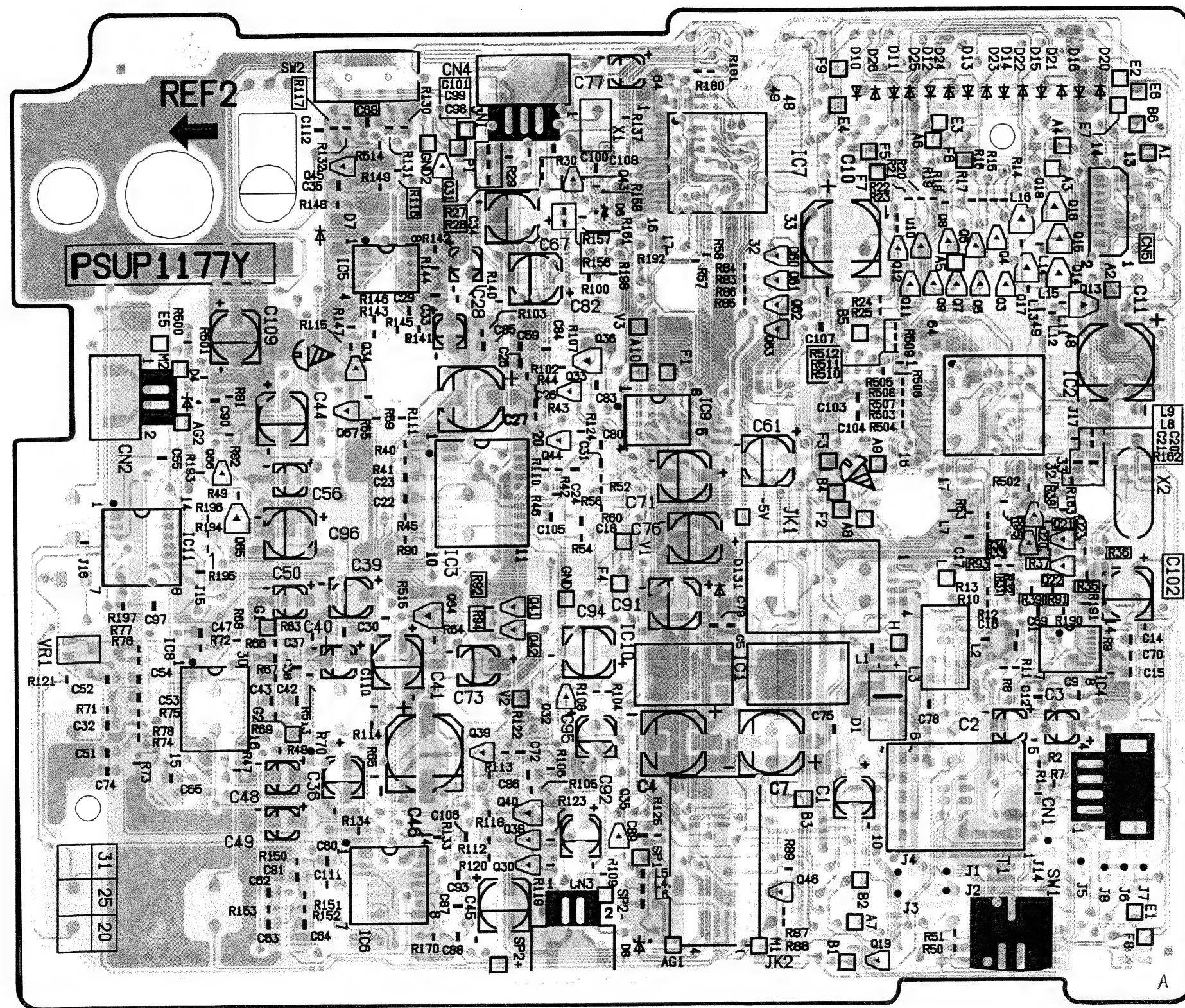
(BOTTOM VIEW)





- Notes:
1. The circuit shown in  on the conductor indicates printed circuit on the back side of the printed circuit board.
 2. The circuit shown in  on the conductor indicates printed circuit on the front side of the printed circuit board.
 3. This printed circuit board may be modified at any time with the development of new technology.

PRINTED CIRCUIT BOARD (MAIN BOARD)

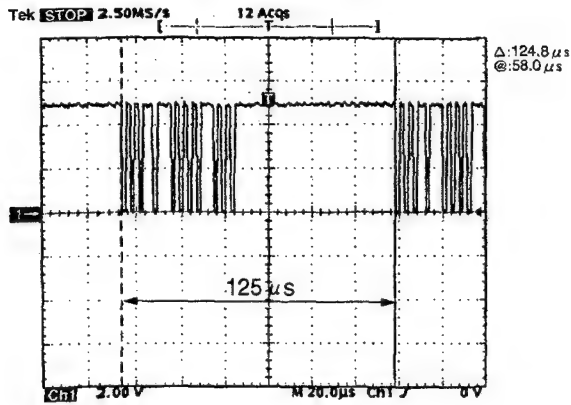
(COMPONENT VIEW)



- Notes:
1. The circuit shown in  on the conductor indicates printed circuit on the back side of the printed circuit board.
 2. The circuit shown in  on the conductor indicates printed circuit on the front side of the printed circuit board.
 3. This printed circuit board may be modified at any time with the development of new technology.

WAVEFORM

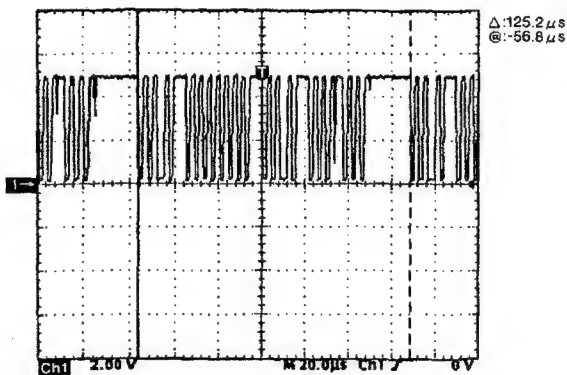
① TX DATA TRANSFER



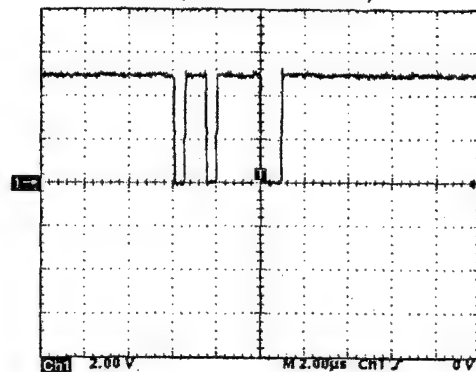
⑤ LED CONTROL DATA



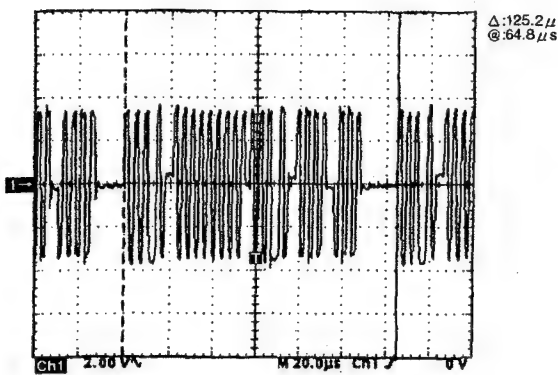
② RX DATA TRANSFER



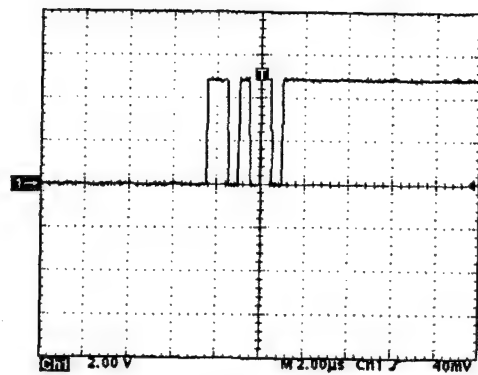
⑥ RX VOICE SERIAL DATA
(VOICE DATA ON)



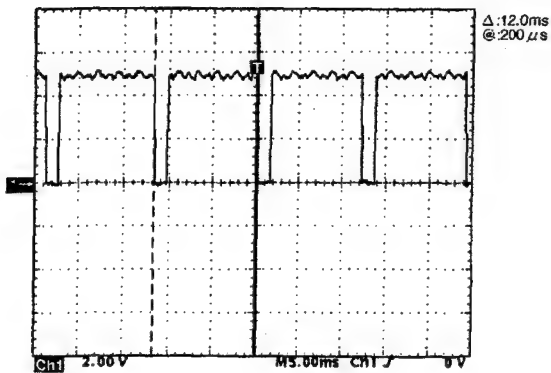
③ H-L DATA



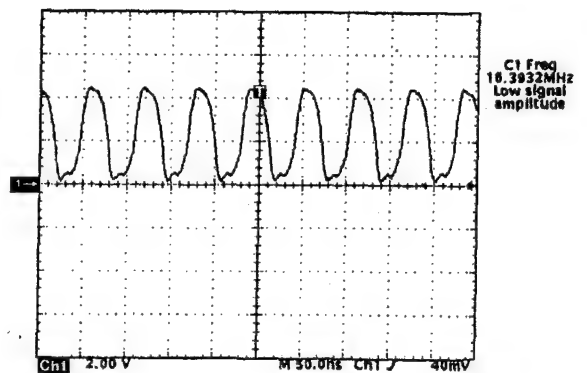
⑦ TX VOICE SERIAL DATA
(VOICE DATA ON)



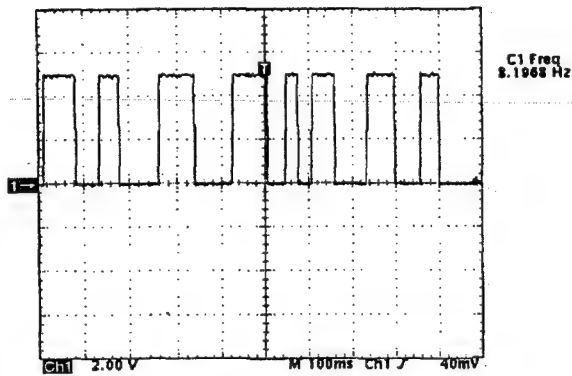
④ LED COTROL DATA



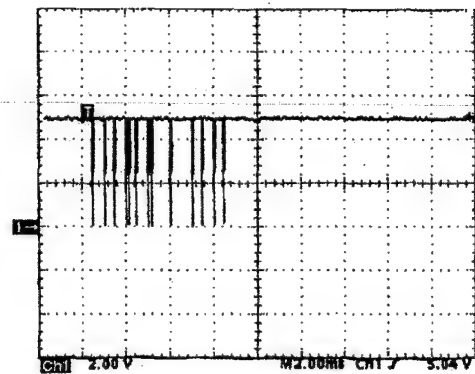
⑧ 16.38MHz CRYSTAL OUTPUT



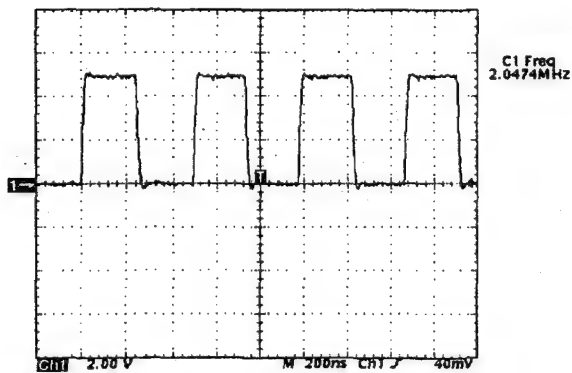
⑨ JOG DIAL
(JOG OPERATION)



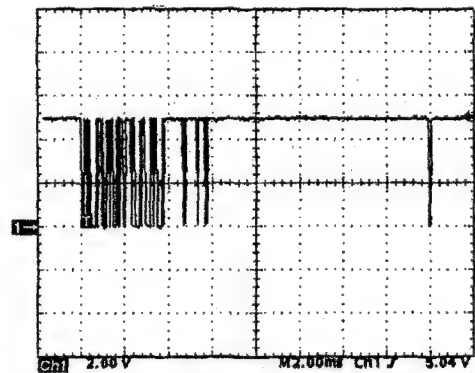
⑬ A0,A1,IOR,IOW



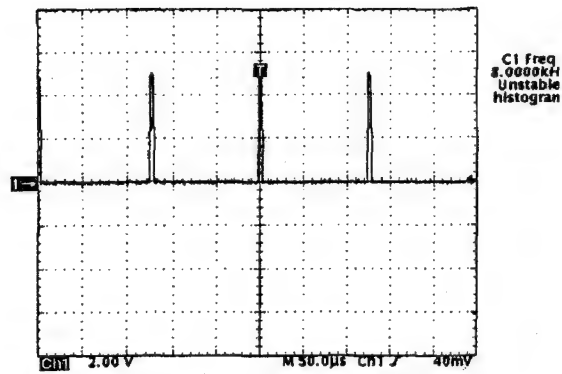
⑩ CK2M



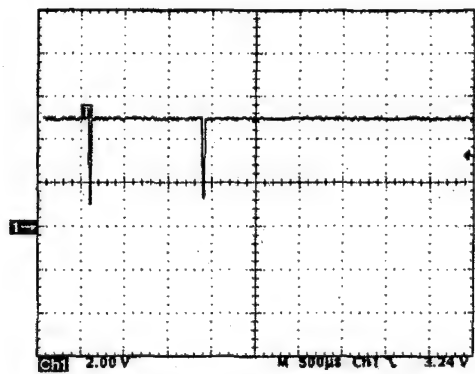
⑭ D0,D1,D2,D3



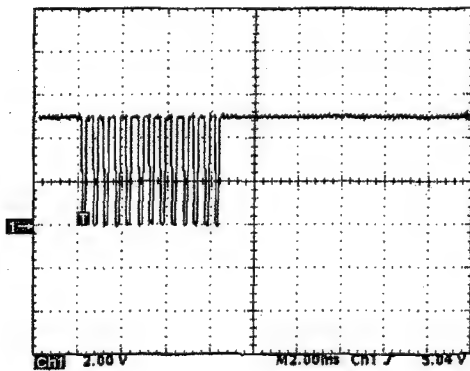
⑪ EP2



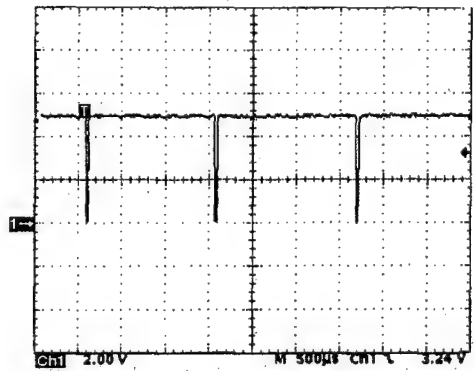
⑮ KEY INPUT (KEY ON)



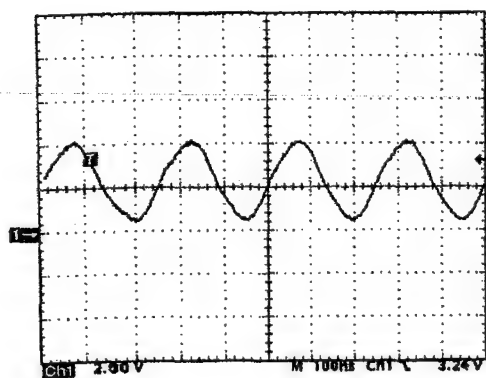
⑫ INT RX, INT TX



⑯ KEY SIGNAL

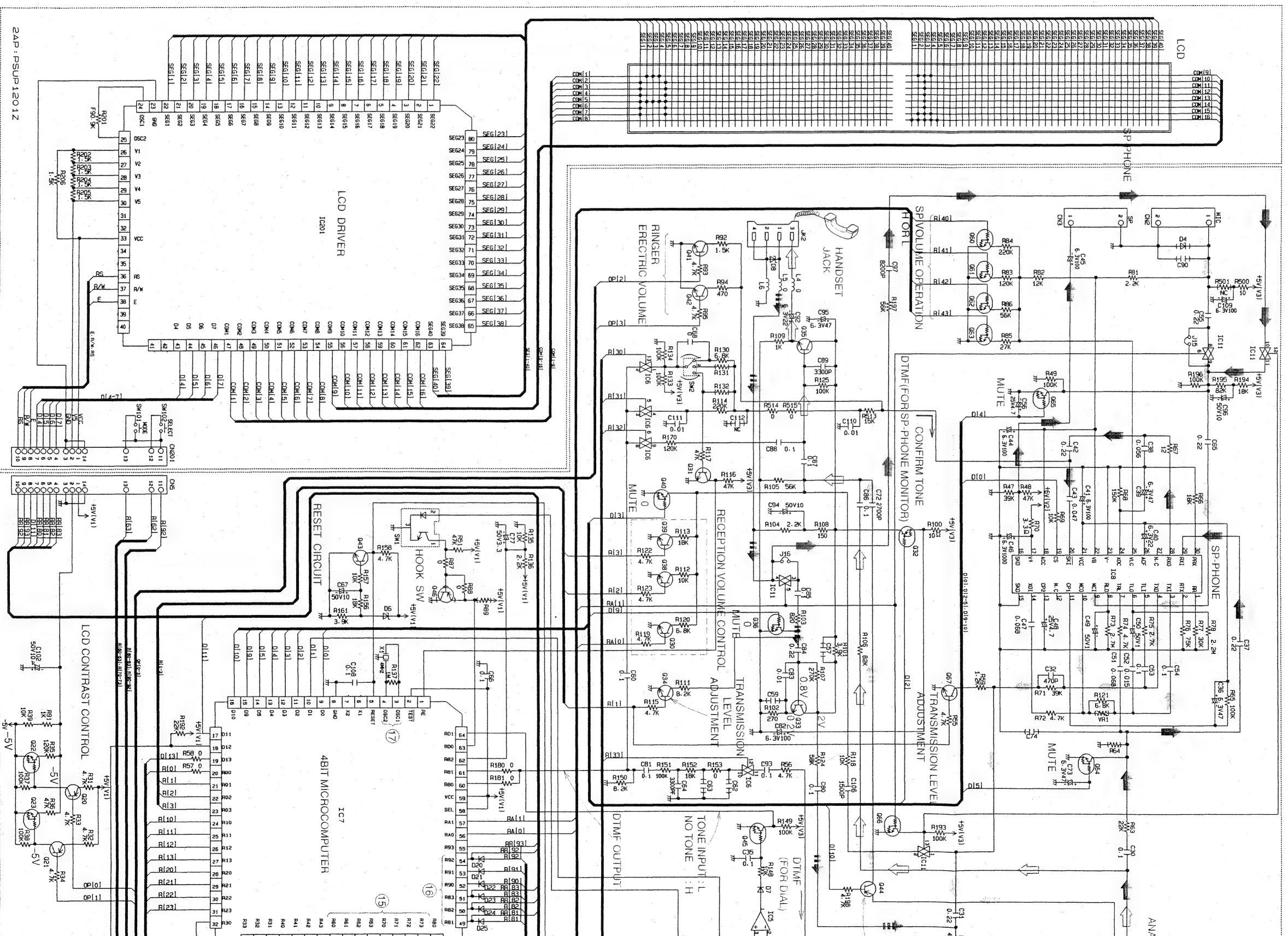


⑪ 4MHz

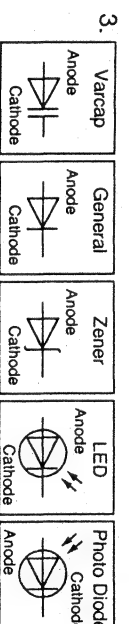


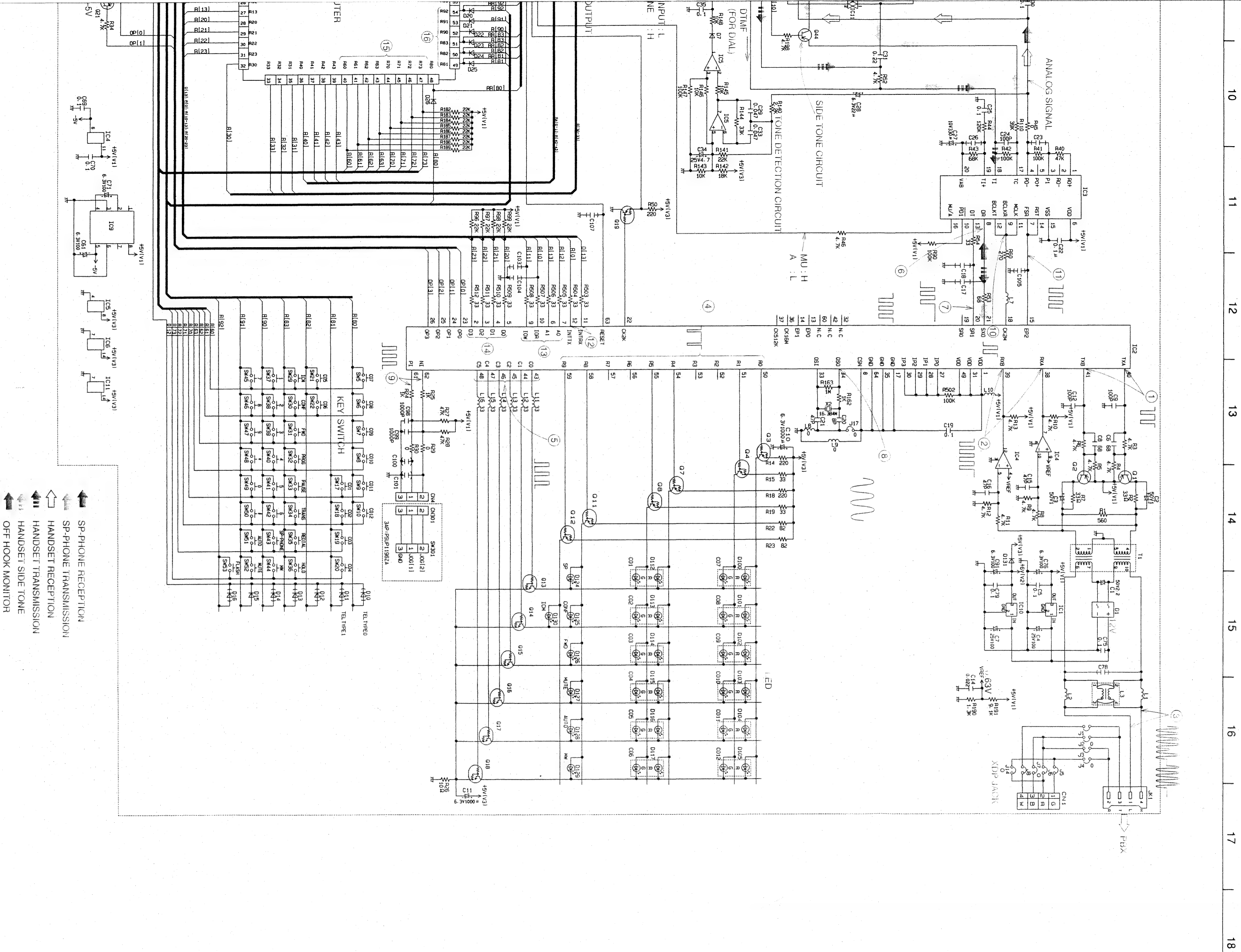
KX-T7431C/KX-T7431C-B

MEMO



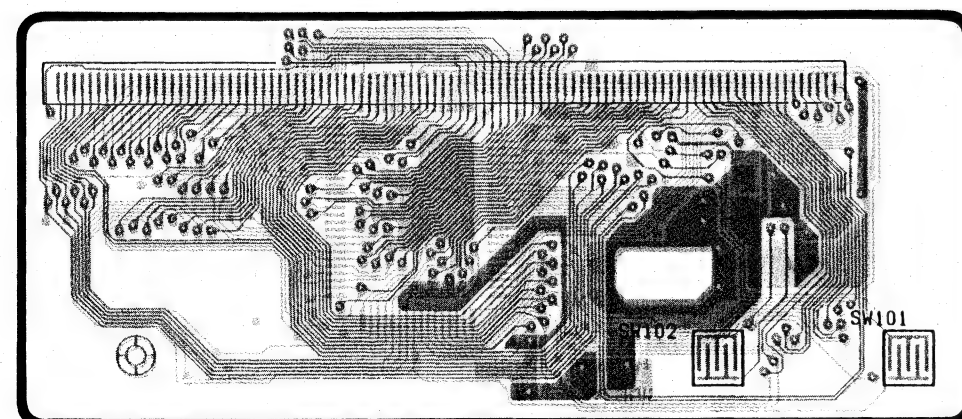
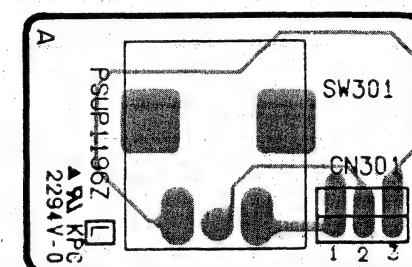
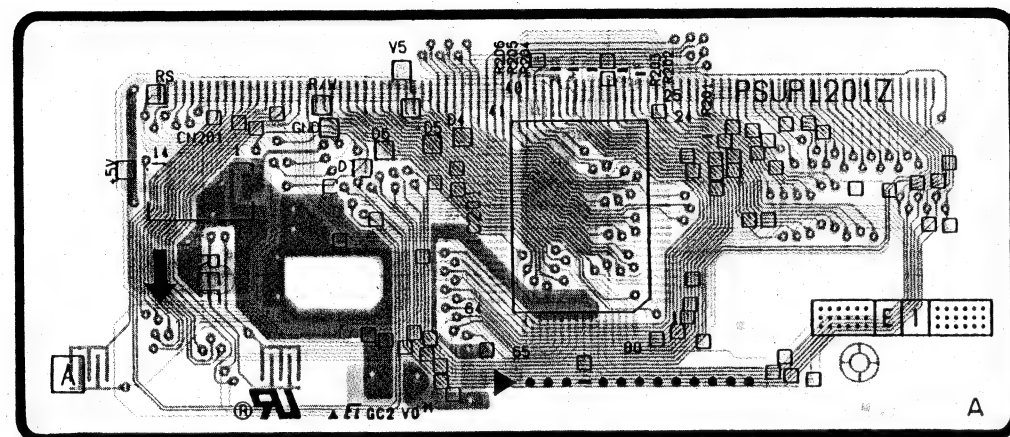
- Notes:
1. DC voltage measurements are taken with oscilloscope from ground line.
 2. The schematic diagram may be modified at any time with the development of new technology.





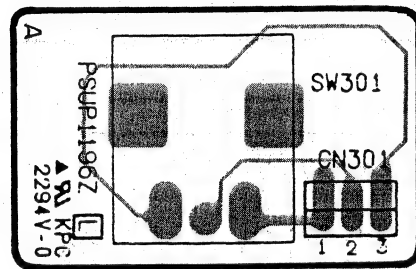
PRINTED CIRCUIT BOARD

1 2 3 4 5 6 7 8 9 10 11 12

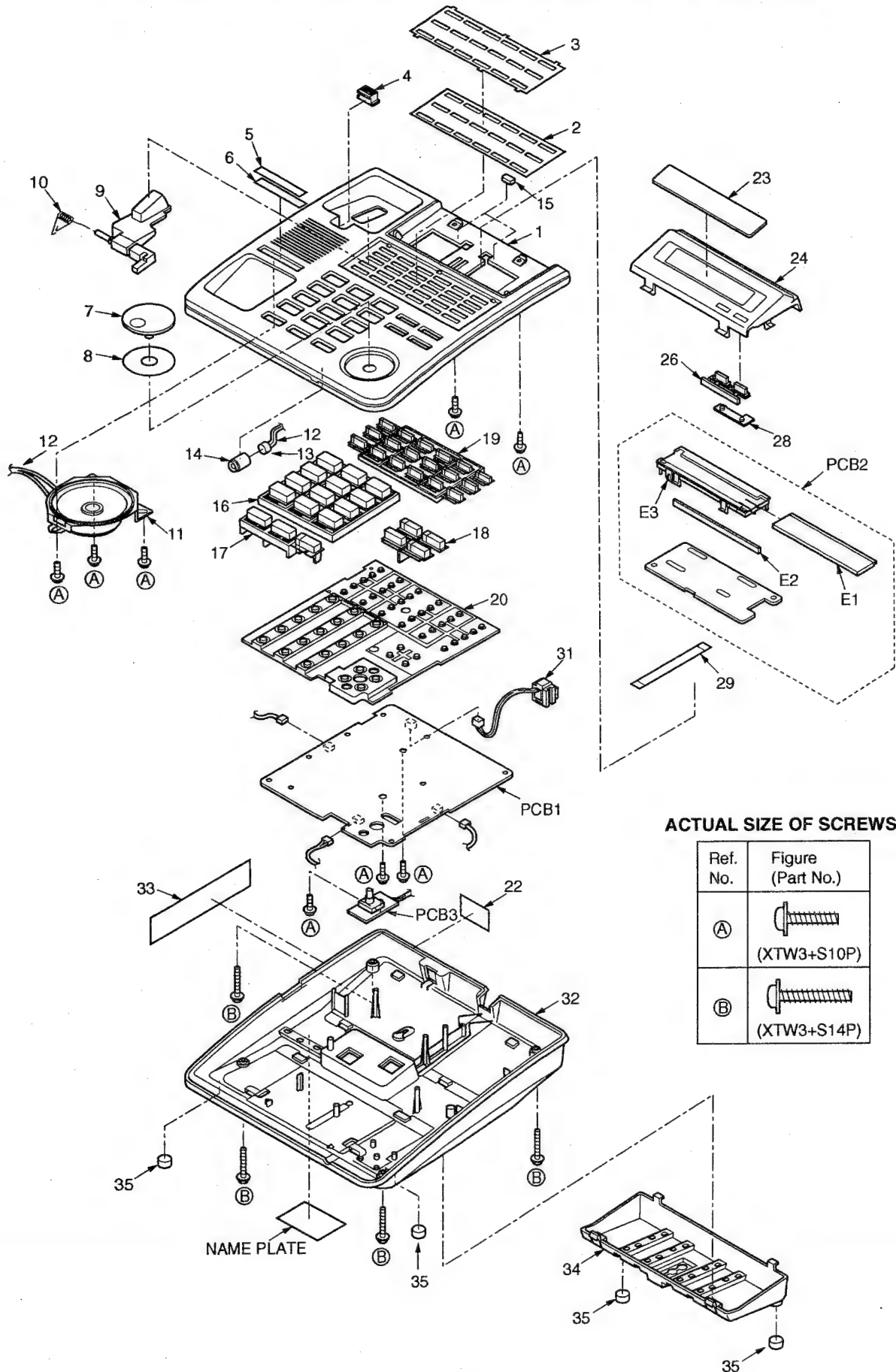


ED CIRCUIT BOARD

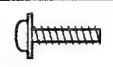
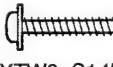
7 8 9 10 11 12



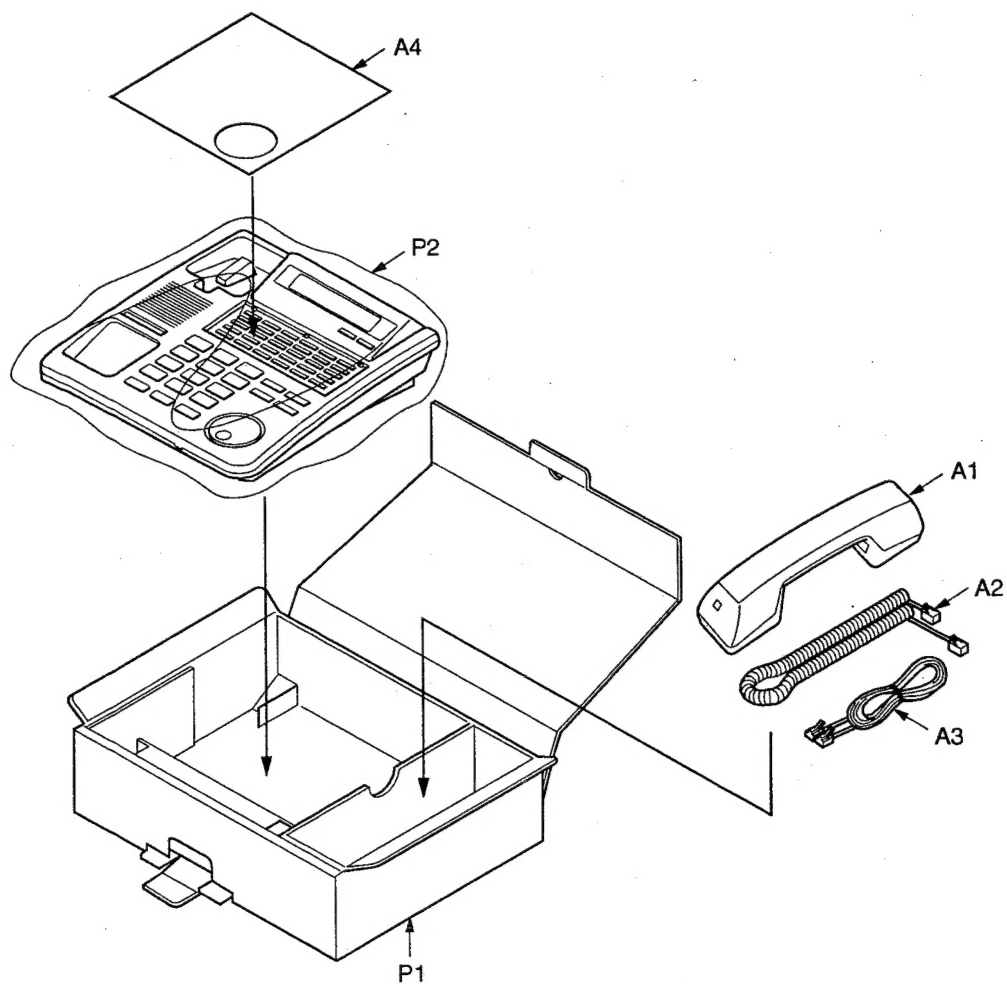
CABINET AND ELECTRICAL PARTS LOCATION



ACTUAL SIZE OF SCREWS

Ref. No.	Figure (Part No.)
(A)	 (XTW3+S10P)
(B)	 (XTW3+S14P)

ACCESSORIES AND PACKING MATERIALS



This replacement parts list is for KX-T7431C/T7431C-B only. Refer to the simplified manual (cover) for other areas.

REPLACEMENT PARTS LIST

Model KX-T7431C/KX-T7431C-B

Notes:

- The marking (RTL) indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependent on the type of assembly, and in accordance with the laws governing part and product retention. After the end of this period, the assembly will no longer be available.
- The S mark indicates service standard parts and may differ from production.

3. RESISTORS & CAPACITORS

Unless otherwise specified.

All resistors are in ohms (Ω) k=1000Ω, M=1000kΩ

All capacitors are in MICRO FARADS (μF) P=μF

*Type & Wattage of Resistor

Type

ERC:Solid	ERX:Metal Film	PQ4R:Carbon
ERD:Carbon	ERG:Metal Oxide	ERS:Fusible Resistor
PQRD:Carbon	ERO:Metal Film	ERF:Cement Resistor

Wattage

10,16:1/8W	14,25:1/4W	12:1/2W	1:1W	2:2W	3:3W
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*Type & Voltage of Capacitor

Type

ECFD:Semi-Conductor	ECQD,ECKD,ECBT,PQCBC : Ceramic
ECQS:Styrol	ECQE,ECQV,ECQG : Polyester
PQCUV:Chip	ECEA,ECSZ : Electrolytic
ECQMS:Mica	ECQP : Polypropylene

Voltage

ECQ Type	ECQV Type	ECSZ Type	Others
1H: 50V	05: 50V	0F:3.15V	0J :6.3V
2A:100V	1:100V	1A:10V	1A :10V
2E:250V	2:200V	1V:35V	1C :16V
2H:500V		0J:6.3V	1E,25:25V
			2A :100V

Ref. No.	Part No.	Part Name & Description	Pcs
CABINET AND ELECTRICAL PARTS			
1	PSKM1052X1	CABINET BODY (KX-T7431C)	1
1	PSKM1052X2	CABINET BODY (KX-T7431C-B)	1
2	PSGD1027Z	CARD, DIAL (KX-T7431C)	1
2	PSGD1034Z	CARD, DIAL (KX-T7431C-B)	1
3	PSHR1142Z	TRANSPARENT PLATE	1
4	PQKE82X1	HANGER (KX-T7431C)	1
4	PQKE82X3	HANGER (KX-T7431C-B)	1
5	PQHR576Z	TRANSPARENT PLATE	1
6	PQHP532X	CARD, TEL. NO.	1
7	PSBC1012Z1	BUTTON, JOG DIAL (KX-T7431C)	1
7	PSBC1012Z2	BUTTON, JOG DIAL (KX-T7431C-B)	1
8	PSHR1164Z	SPACER	1
9	PSBH1002Z1	BUTTON, HOOK (KX-T7431C)	1
9	PSBH1002Z2	BUTTON, HOOK (KX-T7431C-B)	1
10	PSUS1006Z	SPRING	1
11	PQAS65P28Z	SPEAKER	1
12	RJS02Q35Z	CONNECTOR	2
13	RJM142Z	MICROPHONE	1
14	PSHG1122Z	RUBBER PARTS, MIC COVER	1
15	PSHG1180Z	SPACER	2
16	PSBX1039Z1	BUTTON, DIAL (KX-T7431C)	1
16	PSBX1039Z2	BUTTON, DIAL (KX-T7431C-B)	1
17	PSYX1001Z1	BUTTON, 3KEY (KX-T7431C)	1
17	PSYX1001Z2	BUTTON, 3KEY (KX-T7431C-B)	1
18	PSBX1042Z1	BUTTON, 4KEY (KX-T7431C)	1
18	PSBX1042Z2	BUTTON, 4KEY (KX-T7431C-B)	1
19	PSBX1053Z1	BUTTON, 18KEY (KX-T7431C)	1
19	PSBX1053Z2	BUTTON, 18KEY (KX-T7431C-B)	1
20	PSSX1006Z	KEY SWITCH	1
21	Not Used		
22	PQQT11166Z	LABEL, NOTE	1
23	PSGP1030Z1	PANEL, LCD (KX-T7431C)	1
23	PSGP1030Z2	PANEL, LCD (KX-T7431C-B)	1
24	PSGG1010Z1	GRILLE (KX-T7431C)	1
24	PSGG1010Z2	GRILLE (KX-T7431C-B)	1
25	Not Used		
26	PSBX1062Z1	BUTTON, 3KEY (KX-T7431C)	1
26	PSBX1062Z2	BUTTON, 3KEY (KX-T7431C-B)	1
27	Not Used		
28	PSSX1011Z	KEY SWITCH	1
29	PSJE1012Z	FLAT CABLE	1

Ref. No.	Part No.	Part Name & Description	Pcs
30	Not Used		
31	PSJJ1T017Z	JACK, TEL.	1
32	PSKF1024X1	CABINET, LOWER (KX-T7431C)	1
32	PSKF1024X2	CABINET, LOWER (KX-T7431C-B)	1
33	PSQT1309X	LABEL, CAUTION (KX-T7431C)	1
33	PSQT1309W	LABEL, CAUTION (KX-T7431C-B)	1
34	PSKL1005Z1	STAND (KX-T7431C)	1
34	PSKL1005Z2	STAND (KX-T7431C-B)	1
35	PSHA1002Z	RUBBER PARTS, FOOT	4

ACCESSORIES AND PACKING MATERIALS

A1	PQJX2PS409Z	HANDSET (KX-T7431C)	1
A1	PQJX2PM409Z	HANDSET (KX-T7431C-B)	1
A2	PSJA1043Z	CORD, HANDSET (KX-T7431C)	1
A2	PSJA1043Y	CORD, HANDSET (KX-T7431C-B)	1
A3	PQJA48W	CORD, TEL.	1
A4	PSGD1040Z	CARD, OVERLAY	1
P1	PSPK1363Z	GIFT BOX (KX-T7431C)	1
P1	PSPK1417Z	GIFT BOX (KX-T7431C-B)	1
P2	PQPP170Z	BAG, POLYETHYLENE	1

MAIN BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Pcs
PCB1	PSWP1T7431C	MAIN BOARD ASS'Y (RTL)	1
		(ICs)	
IC1	PSVIBA05FP	IC	1
IC2	PSVIBU65050D	IC	1
IC3	PSVIMC5480DW	IC	1
IC4	PQVINJM319V	IC	1
IC5	PQVINJM2904F	IC	1
IC6	PQVITC4066BF	IC	1
IC7	PSVI4668A07H	IC	1
IC8	PQVISC77655V	IC	1
IC9	PQVINJU7660M	IC	1
IC10	PSVIBA06FP	IC	1
IC11	PQVITC4066BF	IC	1
SW1	PSVII24019T1	IC	1
		(TRANSISTORS)	
Q1,2	2SA1576Q	TRANSISTOR(SI)	2
Q3,4	PQVTDTA143XU	TRANSISTOR(SI)	2
Q7,8	PQVTDTA143XU	TRANSISTOR(SI)	2
Q11,12	PQVTDTA143XU	TRANSISTOR(SI)	2
Q13-18	PQVTDTD133HK	TRANSISTOR(SI)	6
Q19	PQVTDTA143XU	TRANSISTOR(SI)	1
Q20,21	2SA1576Q	TRANSISTOR(SI)	1
Q22,23	UN5213	TRANSISTOR(SI)	2
Q30,31	2SC4081Q	TRANSISTOR(SI)	2
Q32	PQVTDTA143XU	TRANSISTOR(SI)	1
Q33,34,35	2SC4081Q	TRANSISTOR(SI)	3
Q36	PQVTFB1J3P	TRANSISTOR(SI)	1
Q38,39	2SC4081Q	TRANSISTOR(SI)	2
Q40	PQVTFB1J3P	TRANSISTOR(SI)	1
Q41,42,43	2SC4081Q	TRANSISTOR(SI)	3
Q44	2SA1576Q	TRANSISTOR(SI)	1
Q45	UN5213	TRANSISTOR(SI)	1
Q60-63	UN5213	TRANSISTOR(SI)	4
Q64,65	PQVTFB1J3P	TRANSISTOR(SI)	2
Q66	UN5213	TRANSISTOR(SI)	1
Q67	2SC4081Q	TRANSISTOR(SI)	1
		DIODE(SI)	
D1	PQVDS1ZB60F1	DIODE(SI)	1
D6	PSVDUDZ39B	DIODE(SI)	1
D7	RLS71	DIODE(SI)	1
D8	PSVDUDZ68B	DIODE(SI)	1
D15	RLS71	DIODE(SI)	1
D20-26	RLS71	DIODE(SI)	7
D100-105	PQVDPY1204	LED	6
D112-117	PQVDPY1204	LED	6
D124-129	PQVDBR1102W	LED	6
D130	PQVDPY1102	LED	1
D131	RLS71	DIODE(SI)	1

KX-T7431C/KX-T7431C-B

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Ref. No.	Part No.	Part Name & Description	Pcs	Ref. No.	Part No.	Part Name & Description	Pcs
CN1	PSJP04A05Z	(CONNECTORS) CONNECTOR, 4P	1	C80,81	PQCUV1E104MD	0.1	2
CN2,3	PSJP02A05Z	CONNECTOR, 2P	2	C82	PSCEV0JA101	100	1
CN4	PSJP03A05Z	CONNECTOR, 3P	1	C83	PQCUV1H103KB	0.01	1
CN5	PSJS14A61Z	CONNECTOR, 14P	1	C84	PQCUV1C224KB	0.22	S 1
				C85-88	PQCUV1E104MD	0.1	4
				C89	PQCUV1H332KB	0.0033	1
		(CAPACITORS)		C91	PSCEV0JA101	100	1
C1	ECEV1HA2R2N	2.2	1	C92	PSCEV0JA220	22	1
C2,3	PSCEV1HA010	1	2	C93	PQCUV1E104MD	0.1	1
C4	PSCEV1EA101	100	1	C94	PSCEV1HA100	10	1
C5	PQCUV1E104MD	0.1	S 1	C95	PSCEV0JA470	47	1
C6	PQCUV1H680JC	68P	1	C96	PSCEV1HA100	10	1
C7	PSCEV1EA101	100	1	C97	PQCUV1H822KB	0.0082	S 1
C8	PQCUV1H680JC	68P	1	C98,99	PQCUV1H102J	0.001	S 2
C9	PQCUV1H101JC	100P	1	C102	PSCEV1HA100	10	1
C10,11	PSCEV0JA102	1000	2	C106	PQCUV1H152KB	0.0015	1
C12	PQCUV1H101JC	100P	1	C108	PQCUV1E104MD	0.1	S 1
C14	PQCUV1H223KB	0.022	1	C109	PSCEV0JA101	100	1
C15,16	PQCUV1H470JC	47P	2	C110,111	ECUV1H103KBV	0.01	2
C19	PQCUV1E104MD	0.1	S 1				
C20	PQCUV1H080DC	8P	1			(JACKS)	
C21	PQCUV1H470JC	47P	1	JK1	PSJJ1T011Z	JACK	1
C22	PQCUV1E104MD	0.1	S 1	JK2	PSJJ1T012Z	JACK	1
C24	PQCUV1H101JC	100P	1			(COILS)	
C25	PQCUV1E104MD	0.1	1	L1,2,6	PQLQR1LT	COIL	3
C27	PSCEV1AA331	330	1	L7,10	PQLQR1RM601	COIL	2
C28	PSCEV0JA220	22	1				
C29	PQCUV1H473MD	0.047	S 1			(RESISTORS)	
C30	PQCUV1E104MD	0.1	1	C68	PQ4R10XJ000	0	1
C31	PQCUV1C224KB	0.22	S 1	J2	PQ4R18XJ000	0	1
C32	PQCUV1H471JC	470P	1	J4	PQ4R18XJ000	0	1
C33	PQCUV1H473MD	0.047	S 1	J7	PQ4R18XJ000	0	1
C34	PSCEV1EA4R7	4.7	1	J14	PQ4R18XJ000	0	1
C35	PQCUV1E104MD	0.1	1	J17	ERJ3GEY0R00	0	1
C36	PSCEV0JA470	47	1	L4,5	PQ4R10XJ000	0	2
C37	PQCUV1C224KB	0.22	S 1	L8,9	ERJ3GEY0R00	0	2
C38	PQCUV1H563KB	0.056	1	L11-16	ERJ3GEYJ330	0	6
C39	PSCEV0JA470	47	1	R1	ERJ3GEYJ561	560	1
C40	PSCEV0JA220	22	1	R2	ERJ3GEYJ330	33	1
C41	PSCEV0JA101	100	1	R3-6	ERJ3GEYJ472	4.7K	4
C42	PQCUV1C224KB	0.22	S 1	R7	ERJ3GEYJ330	33	1
C43	PQCUV1H473MD	0.047	S 1	R8,9	ERJ3GEYJ472	4.7K	2
C44,45	PSCEV0JA101	100	2	R10-13	ERJ3GEYJ472	4.7K	4
C46	PSCEV0JA102	1000	1	R14	ERJ3GEYJ221	220	1
C47	PQCUV1H683MD	0.068	1	R15	ERJ3GEYJ330	33	1
C48	PSCEV1EA4R7	4.7	1	R18	ERJ3GEYJ221	220	1
C49	PSCEV1HA010	1	1	R19	ERJ3GEYJ330	33	1
C50	PSCEV1HA010	1	1	R22,23	ERJ3GEYJ820	82	2
C51	PQCUV1H683MD	0.068	1	R24,25	ERJ3GEYJ102	1K	2
C52	PQCUV1H153KB	0.015	1	R26	PQ4R18XJ100	10	1
C53	PQCUV1H104ZF	0.1	S 1	R27,28	ERJ3GEYJ473	47K	2
C54	PQCUV1E104MD	0.1	1	R29	ERJ3GEY0R00	0	1
C55	PQCUV1C224KB	0.22	S 1	R30	ERJ3GEY0R00	0	1
C56	PSCEV1EA4R7	4.7	1	R31-34	ERJ3GEYJ472	4.7K	4
C60	PQCUV1E104MD	0.1	1	R35	ERJ3GEYJ124	120K	1
C61	PSCEV0JA101	100	1	R36	ERJ3GEYJ473	47K	1
C65	PQCUV1C224KB	0.22	S 1	R37,38	ERJ3GEYJ104	100K	2
C66	PQCUV1E104MD	0.1	S 1	R39	ERJ3GEYJ103	10K	1
C67	PSCEV1HA100	10	1	R40	ERJ3GEYJ473	47K	1
C69	PQCUV1E104MD	0.1	S 1	R41	ERJ3GEYJ124	120K	1
C70	PQCUV1E104MD	0.1	S 1	R42	ERJ3GEYJ104	100K	1
C71	PSCEV0JA101	100	1	R43	ERJ3GEYJ683	68K	1
C72	PQCUV1H272KB	0.0027	1	R44	ERJ3GEYJ124	120K	1
C73	PSCEV0JA470	47	1	R45	ERJ3GEY0R00	0	1
C75	PQCUV1E104MD	0.1	S 1	R46	ERJ3GEYJ472	4.7K	1
C76	PSCEV0JA101	100	1	R47	ERJ3GEYJ393	39K	1
C77	PSCEV1HA3R3	3.3	1	R48	ERJ3GEYJ473	47K	1
C79	PQCUV1E104MD	0.1	S 1	R49	ERJ3GEYJ104	100K	1

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Ref. No.	Part No.	Part Name & Description	Pcs	Ref. No.	Part No.	Part Name & Description	Pcs
R50	ERJ3GEYJ221	220	1	R148	ERJ3GEYJ103	10K	1
R51	ERJ3GEYJ473	47K	1	R149	ERJ3GEYJ104	100K	1
R52	ERJ3GEYJ472	4.7K	1				
R53	ERJ3GEYJ680	68	1	R150	ERJ3GEYJ822	8.2K	1
R54	ERJ3GEYJ330	33	1	R151	ERJ3GEYJ154	150K	1
R55,56	ERJ3GEYJ472	4.7K	2	R152	ERJ3GEYJ183	18K	1
R57,58	ERJ3GEY0R00	0	2	R153	ERJ3GEY0R00	0	1
R59	ERJ3GEYJ122	1.2K	1	R156	ERJ3GEYJ183	18K	1
				R157	ERJ3GEYJ103	10K	1
R60	ERJ3GEYJ271	270	1	R158	ERJ3GEYJ472	4.7K	1
R63	ERJ3GEYJ223	22K	1	R161	ERJ3GEYJ392	3.9K	1
R65	ERJ3GEYJ104	100K	1	R162	ERJ3GEYJ102	1K	1
R66	ERJ3GEYJ183	18K	1	R163	ERJ3GEYJ105	1M	1
R67	ERJ3GEYJ120	12	1	R170	ERJ3GEYJ124	120K	1
R68	ERJ3GEYJ154	150K	1				
R69	ERJ3GEYJ103	10K	1	R180,181	ERJ3GEY0R00	0	2
				R182-189	ERJ3GEYJ223	22K	8
R70	PQ4R18XJ3R3	3.3	1				
R71	ERJ3GEYJ393	39K	1	R190	ERJ3GEYJ132	1.3K	1
R72	ERJ3GEYJ472	4.7K	1	R191	ERJ3GEYJ912	9.1K	1
R73	ERJ3GEYJ275	2.7M	1	R192	ERJ3GEYJ223	22K	1
R74	ERJ3GEYJ472	4.7K	1	R193	ERJ3GEYJ104	100K	1
R75	ERJ3GEYJ272	2.7K	1	R194	ERJ3GEYJ183	18K	1
R76	ERJ3GEYJ753	75K	1	R195	ERJ3GEYJ823	82K	1
R77	ERJ3GEYJ303	30K	1	R196	ERJ3GEYJ104	100K	1
R78	ERJ3GEYJ225	2.2M	1	R197	ERJ3GEYJ563	56K	1
				R198	ERJ3GEYJ472	4.7K	1
R81	ERJ3GEYJ222	2.2K	1				
R82	ERJ3GEYJ123	12K	1	R500	ERJ3GEYJ100	10	1
R83	ERJ3GEYJ124	120K	1	R502	ERJ3GEYJ104	100K	1
R84	ERJ3GEYJ224	220K	1	R503-512	ERJ3GEYJ330	33	10
R85	ERJ3GEYJ273	27K	1	R513	ERJ3GEYJ153	15K	1
R86	ERJ3GEYJ563	56K	1	R514,515	ERJ3GEY0R00	0	2
R87,88	ERJ3GEY0R00	0	2				
R90	ERJ3GEYJ104	100K	1				
R91	ERJ3GEYJ102	1K	1				
R92	ERJ3GEYJ152	1.5K	1				
R93	ERJ3GEYJ472	4.7K	1	T1	PSLT9Z4A	(TRANSFORMER) TRANSFORMER	1
R94	ERJ3GEYJ471	470	1				
R95	ERJ3GEYJ472	4.7K	1				
R96-99	ERJ3GEYJ223	22K	4				
				X1	PSVCYZ0400M6	(CRYSTAL OSCILLATORS) CRYSTAL OSCILLATOR	S 1
R100	ERJ3GEYJ100	10	1	X2	PSVCCR1638B7	CRYSTAL OSCILLATOR	1
R101	ERJ3GEYJ392	3.9K	1				
R102	ERJ3GEYJ271	270	1				
R103	ERJ3GEYJ821	820	1				
R104	ERJ3GEYJ222	2.2K	1				
R105	ERJ3GEYJ563	56K	1				
R106	ERJ3GEYJ123	12K	1				
R107	ERJ3GEYJ274	270K	1				
R108	ERJ3GEYJ151	150	1				
R109	ERJ3GEYJ102	1K	1				
R110	ERJ3GEYJ393	39K	1				
R111	ERJ3GEYJ822	8.2K	1				
R112	ERJ3GEYJ332	3.3K	1				
R113	ERJ3GEYJ822	8.2K	1				
R114	ERJ3GEYJ224	220K	1				
R115	ERJ3GEYJ472	4.7K	1				
R116,117	ERJ3GEYJ473	47K	2				
R118	ERJ3GEYJ103	10K	1				
R119	ERJ3GEYJ472	4.7K	1				
R120	ERJ3GEYJ182	1.8K	1				
R121	ERJ3GEYJ682	6.8K	1				
R122,123	ERJ3GEYJ472	4.7K	2				
R124	ERJ3GEYJ124	120K	1				
R125	ERJ3GEYJ104	100K	1				
R130	ERJ3GEYJ682	6.8K	1				
R133,134	ERJ3GEYJ104	100K	2				
R135	ERJ3GEYJ103	10K	1				
R136	ERJ3GEYJ222	2.2K	1				
R137	ERJ3GEYJ105	1M	1				
R140	ERJ3GEYJ222	2.2K	1				
R141	ERJ3GEYJ223	22K	1				
R142	ERJ3GEYJ183	18K	1				
R143	ERJ3GEYJ103	10K	1				
R144	ERJ3GEYJ333	33K	1				
R145,146	ERJ3GEYJ103	10K	2				
R147	ERJ3GEYJ104	100K	1				